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Original Communications

A STATISTICAL STUDY OF THE INCIDENCE AND TREATMENT OF LABOR COMPLICATED BY CONTRACTED PELVIS IN THE OBSTETRIC SERVICE OF THE JOHNS HOPKINS HOSPITAL FROM 1896 TO 1924*

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EARLY in his career the senior author became interested in the study of contracted pelvis, as shown by the fact that one of his earliest publications was entitled "Pelvimetry for the General Practitioner."

When the obstetric department of Johns Hopkins was organized in October, 1896, opportunity was afforded for developing that interest, with the result that the pelvis of every patient has been carefully and accurately measured, and the rule was laid down that the final measurements recorded in the histories must be made either by the chief or his substitute, or by the resident obstetrician (who has had three years of practical training before assuming the post). Consequently, the pelvic diagnoses are reasonably accurate.

It was soon found that our material was especially suitable for the study of the question on account of the large negro population of Baltimore, with its unusual incidence of abnormal pelves; and as the service continued to increase in size the number of negro patients became disproportionate to their share of the population, and latterly we have deliberately allowed it to exceed that of the white patients. For this reason, we have been able to study the conditions in the two races concurrently and to establish certain important and fundamental differ-

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ences between them. Furthermore, the fact that the service has been under a single head since its inception has made it possible to study in a comprehensive manner the differences in results for both mother and child incident to the several methods of treatment which have been employed during the twenty-eight years under consideration.

In 1910, the senior author analyzed the pelvic conditions observed in the first 4,500 admissions to the service, but did not publish the results, and in 1923, he suggested to the junior author the advisability of continuing the study. Accordingly, a special sheet was prepared, and was filled out with great accuracy and industry by Dr. Sun for every labor complicated by contracted pelvis occurring in the indoor service from history 4,501 to 14,000 (October, 1924). These sheets made readily available whatever information was necessary, and they were tabulated and correlated by the senior author. The results thus obtained, after being combined with those collected in 1910, constitute the material upon which the present study is based.

Frequency.—During the entire period, 14,000 patients were admitted to the indoor service, and of these 11,630 individuals gave birth to 11,925 children which had passed the period of viability, the remaining 2,075 admissions being made up of abortions, women admitted postpartum or discharged before delivery, or who were not pregnant. Of the 11,630 individuals concerned, 6,407 were white and 5,223 black, and 3,100 of them presented contracted pelves. Routine measurement of the pelvic outlet was instituted only after admission No. 2,000. As the entire question of funnel pelvis will be considered in another communication, that type of abnormality will be excluded from the present study. Consequently, upon deducting the 577 women presenting it, we have for immediate study 2,523 women with the usual types of pelvic contraction, who had 2,975 labors in the service.

It may be mentioned at this point that we have adhered to the classification and standards laid down by Michealis and Litzmann, except in the case of the generally contracted funnel pelvis. Under that heading we have grouped together such pelves as present the usual characteristics of general contraction, but in which the distance between the tubera ischii is reduced to 8 cm. or less. Furthermore, we have continued in great part to base our classification upon the length of the diagonal conjugate, notwithstanding Zangemeister's plea for the direct instrumental mensuration of the conjugata vera, for the reason that we have been unable to obtain satisfactory results by means of his pelvimeter or by any other device, except in certain cases of extreme contraction occurring in multiparous women.

Table I shows the relative frequency of the several types of contracted pelvis in our white and black patients and seems to justify certain interesting deductions.

This table is so arranged as to show the striking difference in the incidence of contracted pelves in general in the two races, as well

TABLE I

SHOWING RELATIVE FREQUENCY OF THE SEVERAL TYPES OF CONTRACTED PELVIS IN WHITE AND BLACK WOMEN

TYPE	WHITE						BLACK					
	1-4500		4501-		TOTAL		1-4500		4501-		TOTAL	
		%		%		%		%		%		%
G. C. Typical	85	4.13	219	5.04	304	4.74	294	18.62	574	15.75	868	16.62
G. C. Funnel*	12	0.58	29	0.67	41	0.64	45	2.84	180	4.94	225	4.31
G. C. Rach.	13	0.63	20	0.46	33	0.52	149	9.43	593	16.25	742	14.21
Simple Flat	53	2.58	103	2.38	156	2.43	11	0.70	33	0.91	44	0.84
Flat Rach.	4	0.19	15	0.34	19	0.30	20	1.27	33	0.91	53	1.02
Atypical	10	0.49	11	0.23	21	0.33	2	0.13	15	0.41	17	0.29
		%		%		%		%		%		%
Total	177	8.60	397	9.12	574	8.96	521	32.99	1428	39.17	1949	37.31
		%		%		%		%		%		%
Typical Funnel*	75	6.29	214	4.92	289	5.03	53	6.45	235	6.45	288	6.44

*Measured only after admission, No. 2,000.

as the variations in the order of frequency of the several types in white and black women. Furthermore, it enables us to ascertain what, if any, differences exist between the tabulations of 1910 and 1924, respectively.

TABLE II

SHOWING THE ORDER OF FREQUENCY OF THE SEVERAL TYPES EXPRESSED AS PERCENTAGES OF THE TOTAL NUMBER OF CONTRACTED PELVIS IN EACH RACE

WHITE		BLACK	
G. C. Typical	35.23%	G. C. Typical	38.80%
Typ. Funnel	33.49	G. C. Rach.	33.17
Simp. Flat	18.07	Typ. Funnel	12.87
G. C. Funnel	4.75	G. C. Funnel	10.06
G. C. Rach.	3.82	Flat Rach.	2.37
Atypical	2.43	Simp. Flat	1.96
Flat Rach.	2.20	Atypical	0.76
	99.99		99.99

Upon considering the total figures, it is seen that in our material the usual types of contracted pelvis occur somewhat more than four times less frequently in the whites (8.96 and 37.31 per cent), while the incidence of funnel pelvis is practically identical in the two races. This at once makes it probable that whatever factors are concerned in the production of the usual types operate more powerfully in the negro, while those concerned in the genesis of funnel pelves operate approximately equally in the two races.

Furthermore, upon consolidating into a single group the generally contracted and generally contracted funnel pelves, it is seen that combination is the most usual one in both races, but that it occurs nearly four times more frequently in the blacks (20.93 and 5.38 per cent). Moreover, in white women, the generally contracted pelvis is closely followed by the typical funnel pelvis, while in the black the generally contracted rachitic is the second in order of frequency. Again, upon uniting the generally contracted rachitic and flat rachitic

pelves into a single group, it becomes apparent that rickets plays an extraordinarily important part in the genesis of abnormal pelves in black and an almost negligible one in white women (15.23 and 0.83 per cent). In other words, in our material rachitic pelves occur eighteen and one-half times more frequently in the former. Finally, it should be noted that, while the simple flat pelvis is relatively frequently observed in white women and, in general, may be regarded as the pelvic abnormality par excellence in that race, it possesses but slight significance in black women.

For further clarity, these relationships are expressed in Table II, in which the several types are arranged in their order of frequency, and are expressed as percentages of the total incidence of contracted pelvis in each race. It should be noted that the funnel pelvis has been included in this tabulation, otherwise, the percentages of the other types would be higher.

Reverting to Table I, it is seen that the incidence of abnormal pelvis in our white patients was almost identical in the two periods studied (8.60 and 9.12 per cent), while in the blacks an increase of over 6 per cent had occurred during the second period (32.99 to 39.17 per cent). Such a difference cannot be attributed to increased skill in the detection of pelvic abnormalities, for, if it were, the findings in the white women should exhibit a corresponding change, but, as that is lacking, the increase noted must be due to some other factor. Upon analyzing the figures tabulated, it is seen, if those for the generally contracted typical and generally contracted funnel pelves are combined, that the percentage incidence for the several types in black women shows only insignificant variations, except in so far as the generally contracted rachitic type is concerned; but in that category the incidence has increased from 9.43 per cent in the first to 16.25 per cent in the second period, an increase of 72 per cent. Or, to express it in another way, we now find seven women presenting generally contracted rachitic pelves, instead of four prior to 1910.

This unexpected finding is difficult of explanation, for a priori one would expect that the improved living conditions and greatly increased wages, which the lower classes have enjoyed for many years, would have resulted in a diminution rather than an increase in the occurrence of rickets in general, and of this pelvic abnormality in particular. As our observations indicate the contrary, however, it would appear that the increased prosperity of the negro race in this locality has not had the results anticipated, and in general has not led to increased well-being of their offspring. This is not the place to attempt to study the question in detail, but our experience would seem to indicate that under the influence of urban life, the negro tends to degenerate physically, and the startling disproportion in the incidence of rickets in the two races affords additional confirmation of such a belief. In a general way, it may be said that we are now treating the daughters of the

women delivered during the first period of the activity of the clinic, and it is our impression that, while the frequency of rachitic pelvis has increased, there has, at the same time, been a relative decrease in the number presenting excessive contraction.

Course of Labor.—We shall now consider the course of labor in the 2,274 births complicated by contracted pelvis, which occurred in the second series, 1910 to 1924. Those in the first series have been omitted from our immediate calculation for the reason that they were tabulated in such a manner that their utilization might give rise to certain statistical complications.

Before taking up this study, attention should be directed to the fact that we have somewhat restricted the implication of the term live-birth and have limited it to those cases in which a living child accompanies the mother on her discharge from the Clinic. Such a restriction must necessarily tend to diminish somewhat our conception of what may be accomplished spontaneously by Nature or artificially by operative means; but, nevertheless, we believe that it gives a more correct idea as to what is actually accomplished in the treatment of obstructed labor, as it excludes from consideration the children who die from the effects of disproportion, as well as those succumbing to syphilis, malnutrition, or other causes during the two weeks following delivery.

Excluding 32 labors which occurred in women presenting the so-called atypical varieties of contracted pelvis, such as spondylolisthesis, coxalgia, lumbar kyphosis, etc., there were 2,242 labors in the series: 476 in white and 1,766 in black women.

Fig. 1, in which the ordinates of the graph represent the percentage frequency and the abscissae, the length of the diagonal conjugate, expressed in half centimeters, gives a graphic picture of what occurs in each group, and indicates the great difference in the significance of contracted pelvis in the two races. In the first place, it shows that with every additional half centimeter of contraction the colored woman has more spontaneous and fewer operative labors than the white woman. For example, at the upper limit of contraction, with a diagonal conjugate of 11.5 cm., there were several per cent more spontaneous labors and several per cent fewer operative labors in the blacks; whereas, at the other end of the graph, with a diagonal of 8.5 cm., it is seen that the operative incidence was 100 per cent in white women, while a certain proportion of colored women were still able to expel the child spontaneously.

This difference is due to several factors: in part to the lesser weight of the colored children, but more particularly to the smaller size of their heads, as well as their greater compressibility and malleability. Furthermore, it would seem that the lower nervous organization of the colored woman enables her to withstand with relative impunity a greater intensity of uterine contractions, as well as a longer duration of labor, than the white woman. For these reasons, it sometimes

happens that with an identical degree of disproportion a spontaneous outcome may occur in the former, which would be out of the question in the latter.

These differences become even more striking upon studying Fig. 2, which was constructed to emphasize the difference in the course of labor in the most important type of abnormal pelvis in each race, namely, the simple flat in the white and the generally contracted rachitic in the colored.

This graph, which is based upon the analysis of 135 labors in white and 749 in colored women, shows clearly how much more serious the

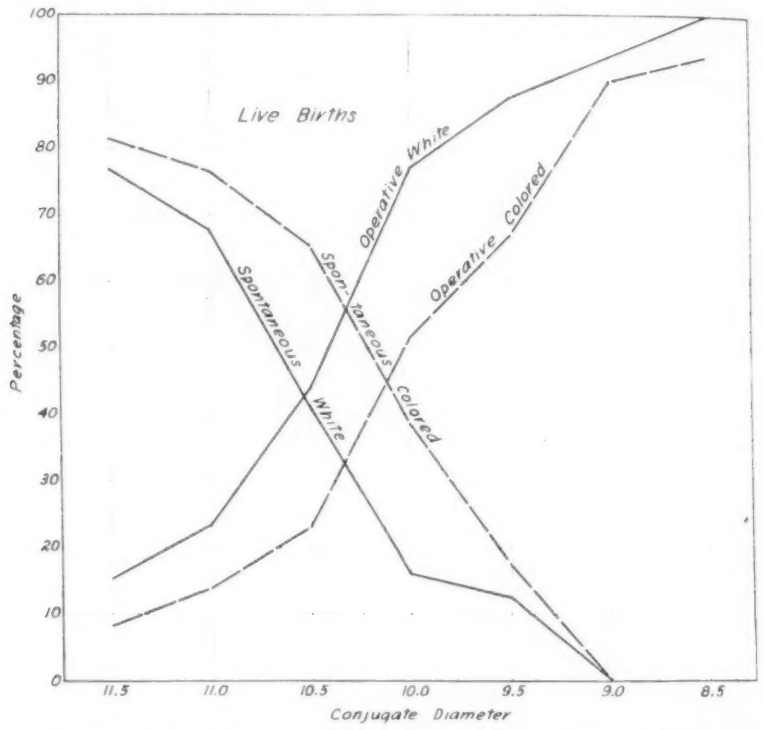

Fig. 1.—Graph showing the number of spontaneous and operative live births, occurring in the two races.

simple flat pelvis is to the former than the generally rachitic is to the latter. In the white woman there are fewer spontaneous and many more operative labors than in the black; and the contrast is further heightened by the fact that, in the simple flat pelvis, the operative incidence becomes 100 per cent when the diagonal conjugate reaches 9.5 cm., whereas in the generally contracted rachitic type spontaneous labor may occasionally occur when the diagonal measures one centimeter less.

From what has been said, no further argument is necessary to prove our contention that the simple flat pelvis constitutes the contracted

pelvis par excellence in the white woman, and in our experience it may give rise to serious dystocia even when mensuration indicates only very moderate anteroposterior shortening. Consequently, we do not hesitate to state that in the white woman a simple flat pelvis, with a diagonal of 10.5 cm., is quite as serious as a generally rachitic one in a colored woman with one-half to one centimeter greater shortening, and that failure to recognize this fact in the past was responsible for the loss of not a few white children.

How can the difference be explained? Very simply to our minds, as the evidence available points to the probability that the generally con-

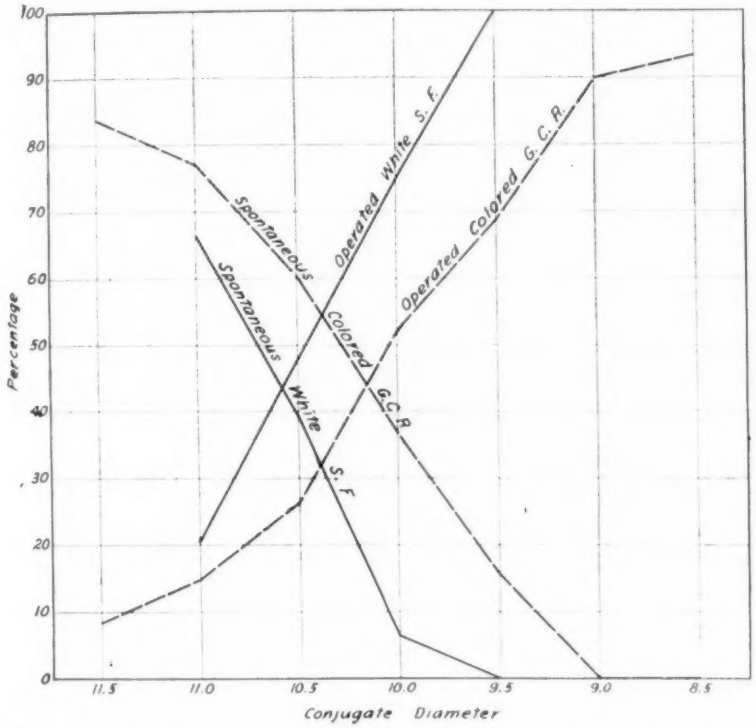

Fig. 2.—Illustrating the course of labor in white women with simple flat, and in colored women with generally contracted rachitic pelves.

tracted rachitic pelvis should be regarded as a manifestation of degeneration, and that the child takes part in the process, as manifested by its smaller size. On the other hand, white women presenting flat pelves, as a rule, manifest no signs of physical degeneration, frequently exceed the average in height and weight, and have babies of more than the average size. That this is not a fanciful conclusion will become apparent when we consider, in the last section of this paper, our figures concerning the size of the child. And here it will suffice to say that in both races the largest children are born to patients presenting simple flat or typical funnel pelves, while the smallest are associated with the

generally contracted types, whether rachitic or not. In other words, it appears that the shortening of the iliac portion of the terminal length of the innominate bone, or the presence of an additional sacral vertebra, which plays the causal part in the production of the two types of pelvis, respectively, cannot be regarded as a sign of degeneration and does not affect the size of the child; whereas the generalized arrest of development which characterizes the bearers of generally contracted pelves is a manifestation of degeneration and is frequently associated with similar changes in the full-term child.

The considerations just adduced incline us to agree with Zangemeister that doubt should be cast upon the classical statement that in predicting the outcome in a given case, one-half of a centimeter should be added to the length of the conjugate vera of a flat pelvis in order to make it obstetrically equal to a generally contracted pelvis. Theoretically, this is doubtless true, but, as it fails to take into consideration the varying size of the child, it is practically incorrect.

In connection with the course of labor, we can only repeat, in common with all previous writers, that premature rupture of the membranes, as well as prolapse of the cord, occurs more frequently in contracted than in normal pelves, and that the former adds to the severity of the dystocia, while the latter materially increases the fetal mortality. We shall, however, not attempt to adduce statistical data in support of our statements, for the reason that we have not at our command any comparative figures showing the incidence of such accidents in normal labor.

From the time of Michealis and Litzmann, all writers have emphasized the increased frequency of abnormal presentations in labor complicated by contracted pelvis, and our experience bears out the correctness of their observations, as is shown by the accompanying tabulation:

	NORMAL LABORS	IN OUR SERIES
Vertex	96.0 per cent	92.05 per cent
Breech	3.0 " "	5.34 " "
Face	0.4 " "	0.58 " "
Transverse	0.5 " "	1.77 " "
Compound	0.0 " "	0.27 " "
	99.99 " "	100.01 " "

Accordingly, it would appear that breech presentations occur approximately twice as frequently, and transverse presentations thrice as frequently in contracted as in normal pelves, which naturally is compensated for by a corresponding diminution in the number of vertex presentations. It is unnecessary to emphasize the point, except to indicate that it necessarily increases the fetal mortality, and in neglected cases adds materially to the danger to the mother.

Owing to the fact that cesarean section at an appointed time before the onset of labor constitutes the ideal treatment of the more serious cases of disproportion, and that in the more moderate ones we limit

vaginal examination to the greatest possible extent during the course of labor, we have an increasingly diminishing opportunity for studying the behavior of the head during its engagement and passage through the pelvic canal. Consequently, we are able to say but little concerning the significance of the so-called anterior and posterior parietal presentations. Indeed, at the present time, practically our only opportunity for such observations is afforded by neglected cases which are brought to us from the outside, or by our own patients in whom we have underestimated the degree of disproportion. So far as our experience goes, we agree with the older writers that the posterior possesses a much more ominous prognostic significance than the anterior parietal presentation. Indeed, it is safe to say that the occurrence of the former inevitably indicates the existence of serious disproportion, which cannot be overcome by the unaided efforts of Nature; whereas the latter usually only represents an exaggeration of the relatively normal Naegele obliquity, is frequently a transient phenomenon, and by no means precludes a spontaneous outcome.

Maternal Results.—After the more or less theoretical and statistical statements thus far adduced, the practical-minded person may inquire what have we really learned about the treatment of labor complicated by contracted pelvis and whether such knowledge has led to the saving of more mothers and children.

TABLE III

SHOWING GROSS AND NET MATERNAL MORTALITY

	FIRST SERIES 701 CASES		SECOND SERIES 2,274 CASES	
		PER CENT		PER CENT
Total maternal deaths	11	1.57	18	0.79
Less infected on admission or not due to dystocia	4	0.57	12	0.53
Due to contracted pelvis or to service	7	1.0	6	0.26

Gross Mortality, Both Series 29 = 0.97%
Net " , " " 13 = 0.44%

	GROSS PER CENT	NET MORTALITY PER CENT
Cases 1-2000	1.90	0.95
" 2001-4500	1.30	1.04
" 4501-14,000	0.79	0.26

Tables III and IV will answer these questions briefly, but some discussion may be required to justify the methods employed in converting the gross into the net mortalities. Casual inspection of Table III shows that there were 29 maternal deaths in the 2,975 deliveries in the two series, and that the gross mortality was only one-half as great in the second as in the first series. On the other hand, it is claimed that the actual or service mortality was diminished nearly four times, namely, from 1.0 to 0.26 per cent, and here, in order to carry conviction, it is necessary to consider certain details.

In the first series there were eleven maternal deaths, four of which

were clearly not due to the service. One of these patients (No. 2,229) died from toxemia, with no sign of infection at autopsy, while the other three (Nos. 372, 694 and 2,568) were admitted infected with dead children after futile attempts at delivery by outside physicians, and died later from infection. The remaining seven deaths were due to the service, and included five deaths following cesarean section. One of the remaining two deaths was due to infection following the only symphysectomy done in the Clinic, and the other was from shock following rupture of the symphysis in a very stout woman. It might be added that the cesarean deaths occurred during our period of learning, and that only one of them followed an elective section, while the other three occurred in patients who were operated upon late in labor and after the development of intrapartum infection, in other words, in the type of case which we now treat by radical or by low cervical section.

Passing to the consideration of the eighteen deaths in the second series, it is found that eight of them had no connection with contracted pelvis, as becomes evident from their mere enumeration:

No. 5,709, Rheumatic endocarditis
" 6,096, 9,046, 9,288, 10,578, Eclampsia
" 9,491, Influenzal pneumonia
" 12,481, Typhoid fever
" 12,905, Late chloroform poisoning

Of the ten deaths remaining, we feel that three certainly and probably a fourth, should not be attributed to the service. Thus, Cases 9,767½ and 10,054 were already infected when admitted, while Case 7,501 had lobar pneumonia and died from a late pneumococcus septicemia. There may, however, be some discussion about the fourth death (7,390). This occurred in a black patient with a 11.5 cm. generally contracted pelvis, who was admitted in labor with a dead child. She had an osteomyelitis of one knee, primary syphilis and a suppurating bubo. Labor was spontaneous and easy and no vaginal examinations were made. Death occurred on the tenth day, and autopsy showed that it was due to streptococcus peritonitis. It appears clear that the fatal outcome was not the result of dystocia, nor of infection originating with us, although its exact mode of production must be regarded as open to question.

On the other hand, we must accept full responsibility for the six deaths remaining. Three of them were due to infection following spontaneous or forceps deliveries. The fourth death (6,730) was due to hemorrhage and shock following rupture of the uterus, which had occurred in the out-patient department. The fifth death (9,422) occurred unexpectedly a few hours after a pubiotomy and was probably the result of shock or of an embolus, but, as an autopsy was not obtainable, its exact cause will never be known. Finally, the last death (8,836) resulted from general peritonitis following an elective cesarean section,

and was due to accidental injury to the intestines which were adherent to the abdominal scar of a previous section.

We feel that the deductions made will bear rigorous criticism, and justify the statement that only six of the eighteen deaths in the second series should be attributed to the service. This constitutes a striking diminution in mortality and indicates that the danger of labor complicated by contracted pelvis was far less in the second than in the first series. The improvement was especially marked in the results following cesarean section, as five deaths occurred in the 26 operations performed in the first series, as compared with a single death in the 221 operations in the second series, a reduction from 19.23 to 0.45 per cent.

In connection with the maternal mortality it is interesting to note that only three of the 29 deaths in both series occurred in white women. As there were 669 white and 2,303 black labors in the two series, it appears that one death occurred to every 223 and 89 labors in the two races, a percentage of 0.45 and 1.12, respectively. This means that the gross mortality was two and a half times greater in the black women. Moreover, the discrepancy becomes even more striking when only the net mortality is considered. In this event it is found that all but one of the deaths occurred in colored women, a percentage of 0.15 and 0.57, respectively. In other words, the net mortality was three and eight-tenths times higher.

How can this difference be explained? We must confess our inability to give a satisfactory answer, but as the patients were treated in the same institution and along the same general lines, it would appear that the solution must be sought in certain conditions peculiar to the negro race. At the first glance, it might be suggested that more colored women enter the service after becoming infected outside, either as the result of imperfect medical attention or of ill judged attempts at delivery; and, if the gross mortality alone were considered, this might be regarded as a plausible explanation. On the other hand, the discrepancy becomes even more striking when the net mortality is considered; but, as in that calculation all such cases had been eliminated, we are forced to seek some other explanation.

Again, it might be argued that more severe degrees of disproportion are encountered in the negro women, so that when a cesarean section is not done on account of an error in prognosis, the patient will be exposed to greater danger of infection and exhaustion. This suggestion, however, scarcely appears tenable when it is recalled that we have already shown that more severe dystocia occurs in white women with simple flat than in black women with generally contracted rachitic pelves. This being the case, it would seem that the explanation must be sought either in the supposition that the black woman is less resistant to the strain of difficult delivery, or that there is something about her which renders her more liable to infection and more susceptible to it when it develops.

In our judgment, something may be said in favor of each supposition, although it is as yet impossible to adduce satisfactory evidence in favor of either. In order to prove the correctness of the first, extensive statistical studies would be required, which cannot be undertaken at this time. Similarly, although we have recently gained the impression that with identical technic colored patients show a considerably higher incidence of febrile puerperia following normal labor, we are not in a position to suggest an explanation for the clinical observation. For these reasons, we must be content to emphasize the fact that our experience shows that labor complicated by contracted pelvis offers a much more serious prognosis in colored patients, and to defer to the future any attempt to adduce a conclusive explanation as to why it is the case.

Fetal Results.—Table IV gives a summary of the fetal mortality and shows that, while there was an increase in the total number of fetal deaths in the second series, the net mortality due to contracted pelvis had decreased by 37.25 per cent (4 to 2.51 per cent).

TABLE IV

SHOWING GROSS AND NET FETAL MORTALITY

	FIRST SERIES 701 CASES		SECOND SERIES 2,274 CASES	
		PER CENT		PER CENT
Total fetal deaths	68,	9.70	286,	12.58
Due to contracted pelvis	35,	4.99	107,	4.71
Less dead on admission	28,	4.00	67,	2.51

NET FETAL MORTALITY

Cases 1-2,000 = 4.73%
" 2,001-4,500 = 3.38%
" 4,501-14,000 = 2.51%

The increase in the total number of fetal deaths is probably attributable to the fact that in the first series no cases were considered unless the child weighed 2,000 grams or more, while in the second series all children were included which had reached the period of viability. As a result, we had to deal with more deaths from prematurity, general debility and syphilis in the second than in the first series. Naturally, in computing the net results, it was necessary to deduct all children which were dead at the time the mother was admitted to the Clinic, particularly as a considerable number of patients came to us after having been subjected to attempts at delivery by their own medical attendants. For reasons which will be given when the question of treatment is discussed, we have divided the first series into two subdivisions: namely, those preceding and those following the two thousandth admission. A glance at Table IV shows that a steady decrease has occurred in each of the three periods, the net mortality being 29 per cent less in the second than in the first, and 26 per cent less in the

third than in the second period, which indicates that more extended experience and more rational treatment has led to progressive improvement in the chances for the child.

In the preceding section attention was directed to the differential maternal mortality in the two races, and, accordingly, the question arises as to whether similar differences obtain in the fetal mortality. Upon analyzing our figures such was found not to be the case, the gross fetal mortality being essentially the same in both races, 12.11 per cent in 670 white, and 11.71 per cent in 2,305 black labors. On the other hand, the mortality due directly to contracted pelvis was distinctly greater in the white children, and exceeded by two-fifths that of the colored children (6.73 and 4.12 per cent). Such figures can only mean that more black children succumb to causes unconnected with disproportion, and a little reflection will confirm the correctness of such a conclusion, as we know that syphilis, prematurity and general debility take a much larger toll from them than from the whites. Furthermore, the difference in the size and malleability of the fetal head in the two races would imply that the dangers of disproportion should be less in the black race; whereas, in white patients, any error in determining the degree of disproportion will necessarily be attended by more serious consequences.

Treatment.—During the twenty-eight years covered by this study, the treatment of labor complicated by contracted pelvis has undergone many changes, which in general can be studied most conveniently by dividing out activity into three periods: 1896 to 1905, 1905 to 1910, and 1910 to 1924, which we shall abbreviate as periods, *A*, *B*, and *C*.

A glance at Table V shows that a single operation predominated in each of the three periods and that version and extraction, pubiotomy, and cesarean section, respectively, followed one another as the operation of choice.

TABLE V

SHOWING THE NUMBER OF OPERATIONS FOR CONTRACTED PELVIS IN EACH PERIOD, AND THE PERCENTAGE INCIDENCE OF THE SEVERAL OPERATIONS

	A	B	C*	A	B	C*
				%	%	%
Low and mid forceps	9	8	19	13.63	13.33	5.54
High forceps	10	1	14	15.15	1.67	4.08
Version and extraction	24	15	32	36.36	25.00	9.33
Cesarean sections	15	11	221	22.73	18.33	64.43
Pubiotomy	1	24	12	1.52	40.00	3.50
Destructive	7	1	45	10.61	1.67	13.12
Total	66	60	343	100%	100%	100%

*Not including ten breech extractions or sundry operations.

During the first period, the mortality from cesarean section was still relatively high, and, except in occasional instances, the operation was not resorted to until the patient had been subjected to the test of labor; in other words, we had not yet learned that it gives ideal results only

when performed at the beginning of labor, or better still at an appointed time shortly before its onset. Furthermore, we had not entirely freed ourselves from the belief that prophylactic version was a desirable procedure, and that there was still a considerable field for the employment of high forceps. Consequently, version and extraction, high forceps, and late cesarean section were the operations most commonly employed during that period, with the result that both the fetal and the maternal mortality was relatively high. In general, the first period may be regarded as the premium paid to experience, and it is safe to say that the two most important lessons we learned during it were: first, that when the patient is subjected to a test of the second stage of labor, a spontaneous outcome may occasionally occur under what appear to be most unfavorable conditions; and second, that convalescence after supravaginal hysterectomy is much more satisfactory than after the classical section.

The second period began with the introduction of pubiotomy. Although one of us had the privilege of personally following Pinard's work with symphyseotomy, we could not become enthusiastic about it; while, in the early days of the Clinic, the death of the only patient upon whom it was performed did not serve to increase our enthusiasm. Consequently, when Van der Velde and Doederlein introduced the operation of pubiotomy, we were ready for the innovation; as, in cases of moderate disproportion, it apparently afforded us a means of subjecting the patient to a test of the second stage of labor and at the same time of avoiding the dangers of late cesarean section.

In several publications we gave our experience with pubiotomy, and we slowly learned that, while it gave very satisfactory maternal results, it was attended by so high a fetal mortality as to do away with its advantages. At no time did we regard it as an ideal procedure or as a primary operation, and we always looked upon it as a makeshift device which gave us a chance to save the child when we had miscalculated the degree of disproportion and had allowed the time of election for cesarean section to elapse. Gradually, however, we resorted to it less and less frequently, until finally we limited its employment to a single indication: namely, certain cases of funnel pelvis in young women, in whom it sometimes afforded not only a means of overcoming the existing dystocia, but also of converting the contracted into an essentially normal pelvis. But, even with this restriction, no pubiotomy has been performed in the service since 1920.

While we were going through this experience, we learned even more thoroughly than before to appreciate the wonderfully conservative powers of Nature, as well as how to differentiate with greater certainty between the patients in whom a spontaneous outcome could or could not be expected. Furthermore, we became still more thoroughly impressed with the danger of late cesarean section, unless it were followed by supravaginal amputation of the uterus, which would put an

end to the reproductive career of the patient. It will be noted that during this period high forceps almost completely disappeared as an operative procedure; while version and extraction, either as a means of delivery after pubiotomy or as an independent operation still enjoyed a considerable vogue.

It was during this second period, that we learned that the employment of radical operative procedures in place of the so-called conservative ones not only led to a reduction in the total operative incidence, but also to a considerable lowering of the maternal and fetal mortality. A glance at the table shows that the combined incidence of pubiotomy and cesarean section was only slightly inferior to that of the latter operation in the third series.

This brings us to the last period, 1910 to 1924, and Fig. 3 shows better than words the tendencies which have governed the operative

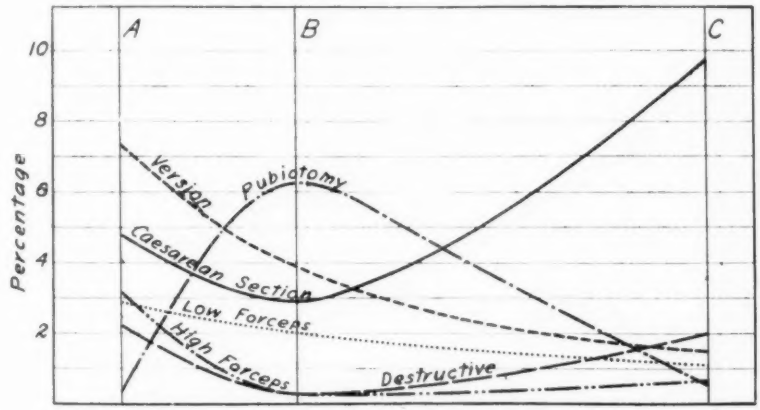

Fig. 3.—Graph showing the variations in operative procedure in each of the three periods.

treatment of pelvic dystocia during the entire twenty-eight years under consideration.

The last period is characterized by two outstanding features: first, the greatest possible extension in the application of prenatal care, and, second, a considerable increase in the employment of cesarean section. The patients are encouraged to register in the prenatal service as early in pregnancy as possible, and to return at monthly and later at biweekly intervals. In this way, no cases of contracted pelvis escape recognition, and as pregnancy advances the development of disproportion and the occurrence of abnormal presentations are detected. Approximately a month before the expected onset of labor, all patients who present any problem, are examined by the head of the department or by his chief assistant, and if necessary return at intervals for further investigation. At these examinations, not only are the pelvic measurements verified, but every effort is made to determine the degree of

disproportion by estimating the size of the fetal head and by ascertaining to what extent it overrides the symphysis pubis.

In this way, it is usually possible to divide the patients into two groups: those in whom the disproportion is so great that our experience leads us to believe that engagement will not occur no matter how efficient the uterine contractions may be, and those in whom it is so moderate that a spontaneous termination of labor can confidently be expected. The former are subjected to classical cesarean section a few days before the calculated date of confinement, with ideal results for both mother and child; while the latter are admitted to the Clinic for observation or are directed to enter it at the onset of labor. In the latter type of case spontaneous birth is the usual outcome, and as time has gone on the proportion of spontaneous deliveries has steadily increased. It must not, however, be understood that we make any claim to omniscience, as we sometimes underestimate the degree of disproportion with the result that the anticipated spontaneous labor does not occur. In such circumstances, the patient is subjected to a fair test of the second stage, and, if it proves ineffectual, she is delivered by what promises to be the most conservative procedure. If the degree of disproportion is moderate, version followed by extraction is still occasionally employed with reasonably satisfactory results; while if the disproportion is more marked, low cervical section is resorted to unless definite signs of intrapartum infection develop, when radical section is performed. Naturally, such treatment is not applicable to the considerable number of patients who are admitted without prenatal care or after having been attended in their homes by their own physicians. In them, classical cesarean section is naturally out of the question, so that if radical operative interference is indicated, the choice lies between low cervical and radical section, or craniotomy if the child is dead or dying.

From what has been said, it is apparent that we believe that the ideal treatment of disproportion by all-wise obstetricians would consist in such ideal prenatal care as to permit the differentiation of all patients into those who will require cesarean section and those who will not, with the performance of classical section before the onset of labor in the former, and with spontaneous delivery in the latter. Unfortunately, such prognostic ability is unattainable, and, if it were, it is safe to say that most of us would find it difficult to live in the same world with those possessing it. Fig. 4, however, shows to what extent we have been able to approximate such an ideal in recent years, and it indicates clearly that in the least and most marked degrees of disproportion theory and practice are in close accord. On the other hand, in the intermediate degrees, the divergence between the curves representing the total operative incidence and the curve for cesarean section gives a good idea of the extent of our failure.

Naturally, the pessimist may object that such teaching is dangerous,

as it is liable to lead to abuse by ignorant or conscienceless practitioners, who may become so liberal in their indications that the two curves must inevitably coincide. We do not believe that even the most captious would venture to suggest such a criticism in our case, for we feel that we have been truly conservative in our indications, as we have been constantly guided by the following considerations: First, we have always contended that the greatest conservatism consistent with the welfare of the patient should be practiced in a teaching clinic; second, we have consistently taught that every operative interference should be regarded as a failure on the part of Nature, and that a much higher

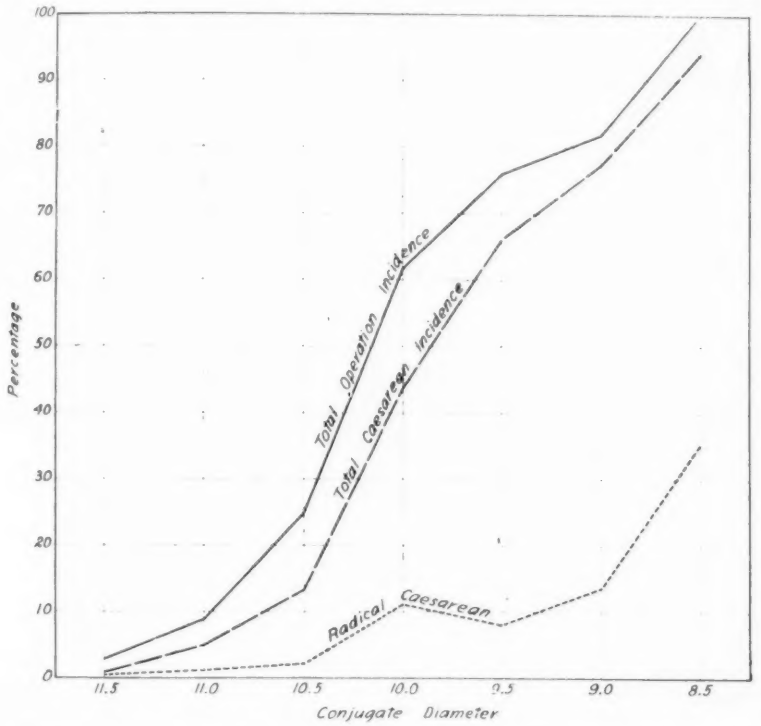

Fig. 4.—Graph showing the total operative incidence and the part played by cesarean section in the third period.

degree of intelligence is required to predict a spontaneous outcome in a borderline pelvis and to see it occur than to perform any operation, no matter how brilliant; third, the performance of 221 sections in the last series of 2,275 labors complicated by contracted pelvis, an incidence of 9.7 per cent, in itself affords conclusive evidence that we have not been unduly radical; and fourth, and finally, from what we know of the operative tendencies throughout the country, we are convinced that few heads of clinics, with so large a contracted pelvis material, would be content to allow anything like so many operative possibilities to escape as we have.

At this point, it would seem permissible to say a few words regarding the several types of cesarean section and our reasons for employing them. Except during the past few years, our choice lay between the classical and radical operation, and as has been pointed out elsewhere, we gradually came to the conclusion that the former when properly performed upon healthy women at an appointed time at the end of pregnancy, or within a few hours after the onset of labor, gives ideal results for both mother and child. Furthermore, the fact that only a single death from infection after elective section occurred in our last series of cases has still further confirmed our opinion. Consequently, we were not tempted to resort to the low cervical section as an elective procedure, and our intuition in this respect has been proved correct by DeLee's admission that such anatomic conditions sometimes follow it that a second operation is attended with considerable difficulty.

A glance at Fig. 4 will show that we have done a relatively large number of radical sections, and we are aware that our practice may expose us to a certain amount of criticism. Our reason for the choice of that operation is twofold. In the first place, it has given us extraordinary results in the presence of suspected or actual infection; the analysis by Harris of 64 such operations performed in our service up to 1922 showed that not a single death had occurred from infection, notwithstanding the fact that many of the patients were admitted in desperate condition. This favorable experience continued throughout the present series, and it was not until September, 1925, that the first patient died from infection following a radical section, and in that instance autopsy showed that its source was an old preexisting broad ligament infection, rather than anything immediately connected with the operation. Consequently, we have gladly embraced every opportunity for performing the radical operation when it appeared indicated, and, while it may be admitted that we have occasionally sacrificed a uterus, we feel that not a few women are alive today who would have perished had any other procedure been chosen. In the second place, we have employed the radical operation as the method of choice for effecting sterilization at a third or fourth section, particularly in colored women. In such circumstances, when we broach the question, we always ask the patient if she wishes to continue to menstruate after the operation, and if she replies in the negative, as most colored women do, we amputate the body of the uterus with a good conscience, with the knowledge that it will effect the desired result, and with the additional assurance that the convalescence will be uncomplicated.

In view of such satisfactory results, we were slow in taking up the low cervical technic. Primarily, it did not appeal to us on general surgical principles, and, notwithstanding the good results reported by many operators following its employment in questionable or actually

infected patients, we were unable to reconcile ourselves to it, until Hofbauer had worked out in our Clinic the peculiar histologic mechanism at the base of the broad ligament which apparently affords an unexpected degree of protection against infection extending directly from the cervix or originating in the pelvic connective tissue. During the past four years, however, we have done a number of cervical sections upon patients who had passed the time of election for the classical operation, and in whom we would previously have resorted to a radical section; and, notwithstanding the fact that certain patients showed signs of definite antepartum infection before interference, the results were unexpectedly good. None of the patients died, but many had a stormy convalescence, and not a few went through a prolonged suppurative process, but eventually recovered. In general, it may be said that the convalescence was more complicated than if a radical operation had been done, but as the patients were eventually discharged alive and with the possibility of further pregnancy, the outcome must be considered satisfactory.

To summarize, it may be said that while we do not share the enthusiasm of many of the advocates for the new operation, it must be admitted that it has a definite place in the treatment of contracted pelvis, and it would seem to be indicated in patients who are seen late in labor, but who are not definitely infected, or in whom the degree of disproportion has been underestimated, and the mistake appreciated so late in labor that we do not dare to resort to the classical operation and yet are unwilling to remove the uterus. Utilized in this way, it will serve to a considerable extent to displace the radical operation, which will come to be reserved almost exclusively for patients with frank antepartum infection, or for those whom we wish to sterilize.

Weight of Children.—In conclusion, we desire to direct attention to certain considerations which have developed from the study of the weight of the children in our two series.

In the first series our deductions were based upon the average weight, whereas, in the second series modal calculations were made. For the latter purpose the number of children were determined which fell into each of the following weight groups:

Less than 2,500	grams
2,500-2,999	"
3,000-3,249	"
3,250-3,499	"
3,500-3,749	"
3,750-3,999	"
4,000-4,499	"
4,500 grams or more	

(It should be noted that, in addition to the children born to mothers presenting the more usual types of contracted pelvis, we have considered those occurring in funnel pelves as well.)

If we set the normal weight of the newborn child at 3,250 grams,

it is found that the number of children which attain or exceed that figure varies greatly in the two races, as well as in the several types of pelvis. This is clearly shown in Table VI, which indicates that practically one-half of the white and two-thirds of the colored children fall below that limit, which makes it readily understandable why so many more spontaneous labors occur in the blacks than in the whites.

TABLE VI

ANALYSIS OF THE WEIGHT OF THE CHILDREN BORN AFTER 1910

	WHITE			BLACK		
	NUMBER	3,250 GR. OR MORE	%	NUMBER	3,250 GR. OR MORE	%
G. C. Typical	258	94	32.6	728	219	30.8
G. C. Funnel	38	9	23.7	204	44	21.5
Simple Flat	135	77	57.1	41	21	51.2
G. C. Rach.	30	14	46.7	749	212	28.3
Flat Rach.	46	20	43.5	15	9	60.
Typical Funnel	230	115	50.	259	90	34.7
Total Number	737	329		1996	595	
	44.64%			29.81%		

The study of these findings, as compared with those obtained from the average weight as in the first series, shows how much deeper an insight into the situation can be obtained by the modal method. For example, upon calculating the average weight of the 701 children in the first series, it was found that the 177 white and 524 colored children presented an average weight of 3,212 and 2,992 grams, respectively. In other words, the former averaged 220 grams heavier than the latter. To most of us this difference of a little less than eight ounces has only a limited significance and in no way prepares us for the fact that less than one-third of the colored children attain to what is usually considered the average weight. Further consideration of Table VI also reveals several additional interesting facts. In the first place, it appears that in every type of abnormal pelvis more heavy children are born to the white than to the black women, the only exception being in cases of flat rachitic pelvis, which occurred so relatively infrequently in the colored race as to make any calculation dubious. In the second place, it is evident that in both races the heaviest children are born to women presenting simple flat pelves, and the lightest to those with generally contracted funnel pelves. On the other hand, the typical funnel pelvis appears to be associated with the second heaviest group of children, while in the colored race the children born to mothers presenting generally contracted rachitic pelves are unusually small.

In other words, it appears that small children are associated with all of the generally contracted types of abnormal pelvis, and relatively large ones with the simple flat and typical funnel varieties. Naturally, it is impossible to explain such variations satisfactorily, but it would

appear plausible to assume that the generally contracted types may be regarded as stigmata of degeneration, and that the imperfect development of the pelvis represents only one of the manifestations of the generally imperfect development which characterizes the entire individual. In this event, it would seem probable that the children would participate in the maternal characteristics, and a certain plausibility is lent to this view by the fact that the smallest children in both races are associated with the generally contracted funnel pelvis; and it would not require a great stretch of imagination to assume that that type of deformity may be regarded as a manifestation of extreme physical degeneracy.

On the other hand, it is a matter of clinical experience that the women with simple flat and funnel pelves are often large in size, and present no manifest signs of physical degeneration, so that in many instances the abnormality would escape recognition except for routine pelvimetry and the clinical signs of disproportion. For this reason, it would appear that the shortening of the iliac portion of the terminal length of the innominate bone, or the presence of a sixth sacral vertebra, which are the causal factors in the production of the two types of pelvis, respectively, may be regarded as accidental occurrences, which are in no way associated with general physical degeneration, and, consequently, the children born to such women would attain or exceed the usual size and present no stigmata of degeneration.

Whether such theoretic considerations are justified or not, the facts brought out by the modal consideration of our findings are of great interest, and serve to explain in a satisfactory manner why a white woman with a simple flat pelvis may have a relatively difficult labor, as contrasted with the relatively easy one in a colored woman with a generally contracted rachitic pelvis presenting a conjugata vera of identical length.

(*For discussion see page* 861.)

THE IMPROVED PROPHYLACTIC METHOD OF TREATING ECLAMPSIA, WITH COMMENTS ON THE VARIATIONS SUGGESTED BY WILLIAMS, STANDER, SPEIDEL, AND KING

By B. Stroganoff, M.D., Leningrad, Russia

THE improved prophylactic method, which for twenty-eight years has been giving the best results, is used at the present time, in its exact form, by very few. Schiller (Germany) and Speidel (U. S. A.) correctly state that this procedure was the first definite plan offered for the conservative treatment of eclampsia in this century. But, notwithstanding the fact that many thousands of cases have been treated successfully by this method and its variations, the incredulous attitude of physicians toward it has not changed, as is proved by the following comments:

1. Zweifel claims that the best results in the treatment of eclampsia are found in the clinic at Leipzig, where the mortality of the mothers is recorded as 8.5 per cent. I showed (*Arch. f. Gynäk.*, cxvi, part 2) that the maternal mortality in our clinic (Petrograd) was 1.4 per cent. It is as though Zweifel were trying to prove that 8.5 is better than 1.4.

2. Prof. Whitridge Williams, in his excellent book, notes our mortality as 10.3 per cent (pp. 620-621, fifth edition), yet on page 626 he asserts that the Dublin method gives equally good results, which is likewise a statement to the effect that 1.7 equals 10.3.*

3. Dr. Speidel writes,—"His (Stroganoff's) latest statistics are even better and in a considerable number of cases conducted by himself there has been no mortality." Later on he continues, "The method does not seem to have met with great favor in this country and reports upon its use indicate that the same results have not been duplicated here." And again, "The Rotunda (Dublin) method offers the best results at present." Now, as a matter of fact, nobody in the United States, so far as I know, has applied the prophylactic method systematically in a sufficient number of cases; and likewise, no one in Great Britain (outside of Dublin) and in the United States has applied the Dublin method in a sufficient number of cases to obtain reliable statistics for the results of either method. Dr. Speidel himself has used a variation of the Dublin method in eleven cases, and has lost two patients, a mortality of 18.2 per cent.

The above facts are difficult to reconcile. Why is it that a method giving results three to ten times better than the average (1.27-2.6 against 20-25) is accurately applied by almost no one? In King's

Editor's Note: It has been found necessary to subject Professor Stroganoff's article to a considerable degree of correction and revision in order to adapt it to English readers, but it is hoped that changes in the context or the author's opinions have been avoided.

*This assertion is not in accord with the original reference.

article, there are statistics showing in the Charity Hospital (New Orleans) a maternal mortality from eclampsia of 49 per cent.

My opponents regarded the good results of my first reports as casual. Later they explained the good results in over three hundred cases as due to the mild character of eclampsia in Leningrad. The fallacy of this last argument is proved by the fact that in most of the lying-in hospitals in Leningrad the mortality was much greater than in ours, and in those hospitals where the mortality was small, the treatment was similar to ours. As illustrative of the variable character of eclampsias, Prof. Novoselsky states that 86,759 births of living children were registered in Leningrad during the years 1922-1924, and that during the same period there were 71 deaths from eclampsia, i.e., 1:1222; whereas, in Germany this ratio was 1:2000-3000, and in England and Wales, 1:1385. In Leningrad, at the Inegiereff Lying-In Hospital during the years 1919-1923, the mortality from eclampsia was 16.4 per cent; in the Obutrov Hospital during the years 1919-1923, the mortality was 35.9 per cent; whereas in our institution there was a mortality of only 1.7 to 2.6 per cent.

The reasons the prophylactic method in the hands of others has given less favorable results than in our own seem to have to do almost entirely with the technic of application. The drugs have not been applied in the combinations and over the periods of time demanded by the prophylactic method, nor has the requisite nursing been given. Dr. Rullet, at the meeting of the Society of Obstetricians and Gynecologists, Leningrad, June 11, 1925, stated that after witnessing my application of the prophylactic method, it was clear to him that he had been attempting its use in quite a different manner. However, good results are to be obtained only by exact application of the method, a fact which explains the excellent results obtained in the clinics of Profs. Leopold, Krönig, and Zöpritz. Medical scepticism as to the prophylactic method should yield before two proofs: (1) The treatment of a sufficient number of cases of eclampsia to exclude chance of casual results. (2) The demonstration in the lying-in hospitals of various countries that the prophylactic method results in scarcely any mortality in appropriate cases. The first of these proofs is detailed at some length below; as regards the second, I have had very satisfactory results in all medical establishments in which I have demonstrated my method, but, of course, the number of cases was not so large as was desirable.

I. NOTES ON A SERIES OF THREE HUNDRED CASES OF ECLAMPSIA TREATED WITH THE IMPROVED PROPHYLACTIC METHOD

1. Of 300 patients, 8 died, 2.6 per cent. Of the latter, 4 arrived at the clinic moribund and died in from three to eight hours after admission.

2. Two patients with mild eclampsias, the first of whom had one convulsion, the other, three, died from pneumonia and sepsis. Another patient could not be treated by the prophylactic method because of the lack of chloral hydrate; in addition this patient had had both legs amputated as the result of an accident. In only one of the eight fatal cases was it impossible to control convulsions. During the tenth and eleventh convulsions, this patient had an apoplectic seizure and died. Possibly without this complication, her life might have been saved. Postmortem examination by Prof. Shorre showed a heart permeated with fat, particularly on the right side where the fat reached the trabecular muscles; generalized adiposity, grippal bronchitis, pulmonary hyperemia without edema, multiple hemorrhages and necrosis of liver, chronic perisplenitis, degeneration of kidneys (nephrosis), cysts and hypoplasia of true corpus luteum, normal postpartum uterus, and fresh hemorrhage into the fourth ventricle. To sum up, we had a general mortality of 2.6 per cent and a reduced mortality of 0.3 per cent.

3. In 40.3 per cent of the 300 cases, there was not a single convulsion from the beginning of treatment; in 44.7 per cent there were from one to three seizures, and four or more in 15 per cent.

4. We observed a great number of "intercurrent eclampsias," i.e., cases in which there is freedom from convulsions for twelve hours or more before delivery.

In 1916, before and during labor, we had 27.5 per cent intercurrent eclampsias. Postpartum eclampsias are excluded because they could not be intercurrent. Among eclampsias during labor there were 63.8 per cent that were intercurrent.

5. In five cases, 1.6 per cent, there were psychic disturbances.

6. The mortality among children is relatively favorable, amounting in the whole group to 16.6 per cent. But if prematurely born children (weighing less than 2000 grams) that died from exposure, operations, etc., before treatment was begun, be excluded, the fetal mortality from eclampsia is 6 per cent.

7. There was not a single maternal death due to treatment. It is known that in treatment of eclampsia by forced delivery, approximately 4 per cent of the mothers die as a result of the operation.

8. There was a relatively small number of operative deliveries, 50 per cent. (?)

9. There were a few cases (1.3 per cent) of pneumonia.

10. Rapid recovery of the patients was general.

On the basis of these 300 cases of eclampsia as well as from the analysis of 578 preceding cases treated in our establishment by the less perfect variety of the prophylactic method, I have reached the conclusion that an almost absolutely favorable prognosis can be given for the mothers in cases that have not been neglected.

In 1918 I was able to collect from the literature, which is far from complete, 2208 cases of eclampsia treated by the old method and its variations, with a total maternal mortality of 9.8 per cent. Among 878 children, born of eclamptic mothers whose history is recorded, the mortality after treatment by this method was about 12 per cent less than in cases treated by other methods in the same clinics. A further search of the literature by Prof. Hinselmann revealed 1094 additional cases treated by the old method, up to 1924, which increases the number of cases to 3302, of which 357 (10.8 per cent) terminated fatally.

On the basis of my papers and after studying the literature, Prof. Hinselmann writes: "Ten and eight-tenths per cent and even 2.6 per cent mortality and 60 per cent of cases with repeated convulsions are not satisfactory figures." Our results demonstrate that the first figure can be diminished very considerably but it is more difficult to lower the second. The number of convulsions can undoubtedly be reduced. However, mortality can be diminished only if patients are hospitalized at an earlier period of the disease.

II. DEMONSTRATIONS OF THE PROPHYLACTIC METHOD IN FOREIGN CLINICS

Treatment of cases in foreign clinics has shown excellent results, although the number is unfortunately small. In 7 cases of eclampsia which I treated in Heidelberg, Vienna, Berlin, and Austria, all patients recovered. Of these, 4 did not have a single convulsion after beginning the treatment. The fifth had one, the sixth two before delivery, with a relapse of one during labor after sixty-three hours, and with one more fit nineteen hours after delivery. Only one patient had six fits. Thus, in 57 per cent the convulsions stopped immediately after beginning the treatment, in 28.7 per cent they were observed once or twice, and in 14.3 per cent there were more than three fits. These figures would have been of no value had they not coincided with, or more properly speaking, exceeded the results obtained in Leningrad in hundreds of cases, which have previously been published.

A more convincing experiment was that of treating eclampsias in different hospitals of Leningrad, partly by personal attendance and partly by telephone consultation. Since March, 1925, I have been called in consultation on 21 cases of eclampsia in Prof. Snegiereff's hospital. All of these patients recovered, and most of them had no fits after the beginning of my treatment. Only one patient, in whom the treatment was incorrectly carried out, had a severe course (16 fits). When this 100 per cent of recoveries is compared to the former death of one in every six cases of eclampsia in this hospital, the experiment must be considered successful. Four other cases were treated successfully in other hospitals, making a total of 25 patients. Formerly I had often used the telephone for consultation treatments

very successfully in Prof. Krassowsky's Lying-In Hospital. The patients were generally in charge of midwives, and I visited them only once a day. In many of 137 eclampties during twenty-four years I gave my instructions partly by telephone, and in mild cases I saw the patient for the first time on the following day. This telephone consultation has the advantage of preventing delay in application of the method, which is especially desirable in view of the high mortality of eclampsia.

In the Cologne (Germany) clinic the statistics of mortality (1875-1920) are 128 (22.9 per cent) maternal deaths out of 558 cases of eclampsia, and 34 per cent fetal deaths. In England, the maternal mortality is 22.5 per cent; in the Royal Maternity and Women's Hospital of Glasgow, during 1913-1922, 183 fatalities occurred in 813 cases of eclampsia (22.4 per cent) and 60 per cent of the children died. In the United States, King gives a maternal mortality of about 49 per cent; Rice, about 46 per cent; and Williams, of about 21.7 per cent in exclusively postpartum eclampsia, which in my opinion are the mildest cases.

Mortality from eclampsia and albuminuria in relation to delivery is next if not equal to that from sepsis. I have tried here to set up a standard of possible attainment through the use of the improved prophylactic method, and assert that its different variations have the effect merely of decreasing its value. It is in this connection that I would like to discuss the articles of King, Stander, and Speidel.

Speidel is correct in stating that better results are obtained in eclampsia by conservative than by surgical treatment, in maintaining that the treatment of eclampsia today is in rather a chaotic condition, and that annual publication of methods and results of their use is highly desirable. Unfortunately, while acknowledging the great value of the prophylactic method, Speidel does not arrive at the conclusion that the test of the method is indispensable, but proposes instead his own variation of conservative treatment. We are ready to agree with him that our principal task should be to control the convulsions. But he is scarcely right in denying the use of chloroform on the grounds that it causes the same changes in the liver as the toxemia of pregnancy. If our main task is to control the convulsions, chloroform is the best means. It paralyzes the vasomotor nerves, diminishes the blood pressure and calms the patient. It is to be administered in slightly concentrated form and in small quantities, 3 to 4, seldom 10 gm. or more at a time. We make it a rule to treat the patient in a gentle manner; we scarcely touch her at all. Inhalation of 25 to 50 gm. of chloroform during a period of from five to twenty hours, with a free admixture of air, is not likely to cause poisoning, my belief being based on experience with 878 cases.

Dr. Speidel is correct in recommending the use of oxygen immedi-

ately after the paroxysm. Asphyxia is a kind of toxemia and should be overcome as quickly and completely as possible. In describing the prophylactic method, Dr. Speidel states that I give narcotics "until the fits are controlled." This is not quite so, and this is a very important point in which my method differs from others. I give narcotics not until the convulsions are controlled, but until there no longer exist symptoms of an impending fit. As a rule, I recommend narcotics in mild cases of eclampsia postpartum, until at least twelve hours after the time of the last convulsion. In cases of eclampsia during or before labor the time must be prolonged to twenty-four hours. If symptoms of an impending attack are seen on the second day, treatment is to be continued (1 to 1.5 gm. of chloral hydrate, three times daily). Light in the patient's room should be enough only for the nurse's attendance. Sleep is necessary. Bowel lavage is to be applied only in cases signally demanding it. Eclamptic patients rarely require stomach lavage, as they are not inclined to overeat, because of premonitory symptoms. Further, stomach lavage is not free from danger; Prof. Lichtenstein describes two fatal cases. Saline injections are dangerous on account of a nephritis; injections of glucose solution are also (perhaps a little less) dangerous. Venesection (about 700 c.c.) not only lowers blood pressure and removes toxins but favorably affects the heart and pulmonary circulation.

Dr. Speidel recommends placing the patient on her left side; I prefer the right side, in order to avoid extra pressure on the heart. It is highly desirable to change the posture of the patient in bed four to six times daily to avoid hypostatic pneumonia. I protest most emphatically against failure to use narcotics in comatose patients, for, although not conscious, they undoubtedly preserve an unconscious sensibility.

In regard to the criticism of the improved prophylactic method, Dr. Stander indicates that 10.5 to 15 gm. of chloroform is to be considered as a maximum dose. As a matter of fact, we generally use 3 or 4 gm. In London, for instance, I used 28 gm. of chloroform in twenty-four hours' time, but in this case I was obliged to give narcotics in larger quantities than in Russia, because of the greater noise from the street. Dr. Stander includes among the cases of eclampsia observed during 1914-1924, one patient that died apparently of apoplexy and sepsis. I do not consider this case as one of eclampsia, as there were no convulsions, and I do not recommend my method for such cases. I may remark parenthetically, that I have never seen a case of eclampsia without convulsions, and I do not know how such cases should be treated. I have regarded the above case from the autopsy findings as one of cerebral hemorrhage. Dr. Stander makes the curious affirmation that he found among our patients many cases

of nephritis. Now it is possible that among many hundreds of cases in our clinics there might be an occasional mistaken diagnosis, but Dr. Stander's statement of many cases of nephritis can hardly stand against the diagnoses made by many obstetricians after the most careful analysis of each case. Furthermore, has Dr. Stander seen in his own clinic many cases of nephritis with only one uremic convulsion? For if our patients were, as he implies, nephritics, rather than true eclamptics, then the prophylactic method would have the added virtue of controlling uremic convulsions. As a matter of fact, this method has been observed to be of value in cases of uremic convulsions and in cases of status epilepticus. In regard to the mild type of our eclampsias, this is generally a natural consequence of the efficiency of treatment.

As for Stander's method of treatment, the following criticisms may be made: (1) It includes only a minimum dose of medicaments, whereas it is better to vary the dose in accordance with the severity of the case and the patient's strength. (2) Injection of 500 c.c. of a 5 per cent solution of glucose, as stated above, is more dangerous than useful, since it causes rise of blood pressure and unnecessary irritation. Our experience has shown this procedure to be perfectly useless. (3) In severe cases of eclampsia, bloodletting is so useful that it must be retained. (4) Keeping patients warm and slightly perspiring must also not be neglected.

Finally, in regard to Dr. King's variation of conservative treatment: (1) The injection of 0.03 gm. of morphia as the initial dose may be useful to the mother but can scarcely be of use to the child. (2) Bloodletting of 500 to 800 c.c. may perhaps be effective in the case of strong American women, but it seems excessive for European women, particularly as smaller quantities are equally effective. (3) Introduction of 4 gm. of chloral hydrate at one time seems to be a large dose, although I am inclined to increase the first dose to 2.5 gm. The weak point of this variation is in the absence of care to prevent the fits, a lack which brings back the old method, which has proved ineffective. Dr. King is against the induction of labor during the convulsions, although in the examples he cites, he very often breaks the rule. For the induction of labor, we generally rupture the membranes, after which, ordinarily, labor soon begins because the uterus is in a state of increased irritability. Out of six cases of eclampsia treated by Dr. King, one died, i.e., a 16.6 per cent mortality.

On the basis of theoretic analysis, as well as from the consideration of the facts, it appears that these three variations of the conservative treatment of eclampsia can scarcely give better results than the improved prophylactic method, which can be advantageously applied to patients both in lying-in hospitals and at home.

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GLUCOSE AND INSULIN IN THE TOXEMIAS OF PREGNANCY*

By C. Jeff Miller, M.D., F.A.C.S., New Orleans, La.

ECLAMPSIA and the various other toxemias of pregnancy must still be characterized as diseases of theory for the reason that in spite of intensive work done along various lines their origin is as yet entirely unknown. Recent investigations have tended to support the belief that there is some common factor underlying those arising in early pregnancy, as pernicious vomiting, and those of the later months, as preeclamptic toxemia and eclampsia, but as yet no definite proof has been adduced to establish this contention. The condition has been variously attributed to fetal and placental toxins, to glandular disturbances, to autointoxication, or to malfunction of the maternal liver, although there are authorities who claim that this hepatic malfunction, like the acidosis which almost invariably accompanies such toxemias, is a result and not a cause. The laboratory investigations of the last few years, however, plus the brilliant results obtained through the administration of glucose in the various toxemias, and, more recently, glucose combined with insulin, suggest more firmly than ever that some metabolic disturbance is at the root of the trouble and that the factor most largely concerned is the carbohydrate balance.

Postmortem findings have shown that fatty necrosis of the liver is almost constant in fatal cases of toxemia and clinically it would appear that the metabolic factor at fault is a temporary lack of glycogen. Theoretically, then, it would seem that this condition, together with the acetonuria which usually accompanies it, could be obviated by an abundant supply of carbohydrates, and Titus and his coworkers have practically proved this through postmortem photomicrographs, which show that the livers of those patients who have died of eclampsia following treatment by glucose lack the definite fatty necrosis and periportal hemorrhages supposed to be an invariable sign of the disease. It is certainly logical to suppose, since the liver is known to have greater powers of regeneration than any other

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, January 14, 1926.

organ in the body, that if the pathology has not become too grave, the liberal administration of carbohydrates in the form of easily assimilable glucose would effectively check the toxemic process, particularly if the utilization of the glucose were hastened by the addition of insulin. If the process has been allowed to become too grave, naturally the liver will have lost its powers of regeneration and cannot absorb the glucose which it needs even more than the normal organ.

There are various theories to account for this liver involvement, perhaps the most reasonable of which is Slemons' contention that the fetus and placenta require large amounts of glycogen, which will naturally be secured from the maternal liver, as the glycogen storehouse of the body. If a diet rich in carbohydrates is supplied this demand can be met; if not, the liver supply will be exhausted, fatty replacement with degenerative changes will occur, the liver function will be impaired, and the system will shortly be flooded with toxins.

The acidosis which is so prominent a factor in the last stages of pernicious vomiting is not only a result of the stomach's intolerance of food, but tends to increase that intolerance and so to prolong the nausea and vomiting. A vicious cycle is thus set up which can only be broken by checking the vomiting, usually by abortion, or by ending the acidosis, which the administration of glucose and insulin does admirably. It might be pointed out here that if this theory is correct, our present habit of restricting the diet of toxemic patients is radically wrong; we are adding starvation with its resulting acidosis to the already complex toxic picture, and food is not only indicated but demanded.

Certain other laboratory studies are of interest. Williamson, for instance, has recently shown that there is throughout pregnancy a slight but very definite reduction of the blood alkali reserve and that in some cases this reduction reaches dangerous limits. Other investigations have shown that there is also a reduction of the tension of the carbon dioxide of the alveolar air. Thalhimer, whose work throughout has been most valuable, suggests further fields for biochemical investigation, basing his inquiries upon these facts already proved. "Might these data indicate that there is in pregnancy a fundamental change in carbohydrate metabolism, and not merely a carbohydrate deficiency? Does the glycosuria in pregnancy following a small dose of phloridzin also indicate a change in carbohydrate metabolism, or only an increased permeability of the kidneys to glucose? Since excessive vomiting of pregnancy is a disease of early pregnancy, is the carbohydrate metabolism deranged until the beginning of the development of the fetal pancreas?" It may be that out of the solution of such problems as these will come the solution of the vexing problem of the origin of the toxemias of pregnancy, but it is obvious that this happy result will be achieved only by the combined efforts of the

clinician and the laboratory worker, particularly the physiologist and the biochemist.

In spite of the fact, however, that the origin of the toxemias of pregnancy is still an unsolved problem, it is clearly evident that in glucose, particularly when combined with insulin, we have added a very valuable therapeutic agent to our obstetric armamentarium. It is true that we do not as yet know just what their action is in causing the disappearance of the ketone bodies, nor, for that matter, do we know the exact mechanism of the insulin reaction alone. The theory that it is associated exclusively with the internal secretions of the pancreas has been proved untenable by the discovery of the substance in various body tissues and even in the tissues of individuals who have died of diabetes. No matter, however, what the nature of the reaction, the fact remains that glucose and insulin in combination will apparently check nearly all the toxemias of pregnancy in their early stages and will markedly benefit many in the later stages.

Perhaps the method may be set down at present as empirical. I am aware that some authorities object to the stand taken by Thalhimer and his followers on the ground that a deficiency of blood sugar has not yet been demonstrated by a single observer, and that therefore the introduction of more sugar is illogical if not actually dangerous. Certainly, if the method is to be carried to its logical conclusion, there should be careful estimations of the blood sugar, of the liver sufficiency, and of the blood alkali reserve in large series of cases by competent observers. In view of the results already achieved from the method in its so-called empirical stage, it is not too much to hope that later, as a result of its continued use and investigation, we may expect to achieve the establishment of certain definite standards which will enable us to determine, for instance, when a pregnancy must be terminated or when it may safely be allowed to continue, points which, at present, must be decided from the patient's general condition, an obviously treacherous guide upon which to base our procedure.

For the last five years I have been using glucose in the treatment of the toxemias of pregnancy and for the last several months I have been using it in connection with insulin. The success of the method has induced me, more than any other one thing, to rely upon conservative measures in handling such cases. Routine measures are naturally employed also, but to my mind it is the glucose and insulin which turns the trick. The proper administration of the glucose is of the utmost importance. Proctoclysis is unreliable; hypodermoclysis, while better, is not entirely satisfactory, and the ideal method is intravenous infusion. We have been using a 5 per cent solution in the ordinary case, and giving one unit of insulin for every 3 gm. of glucose until 10 to 15 units have been given altogether. Moreover, we have found it

safe to repeat the procedure as indicated. The insulin, of course, is given by needle.

While I have made no detailed study of my records, I may safely say that in the last five years at least 40 cases of toxemia and 20 of eclampsia have been treated by our individual modification of the Stroganoff method, combined with glucose, with excellent results. Lately, we have added insulin to the method, and the results have been even more brilliant. The number of cases, of course, is still too small to warrant dogmatic conclusions, but certainly the results have been striking enough to warrant consideration, and, because of these results, and because of the fact that the method is based upon careful biochemical investigations the outcome of which has been generally accepted, it would seem that the treatment is worthy of systematic adoption in an obstetric service.

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(*For discussion see page* 865.)

PHOCOMELUS WITH CONGENITAL CYSTIC ELEPHANTIASIS

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Rokitansky[1] with commendable brevity defines phocomelus as a "monstrosity with phocal (seal-like) extremities, the hands issuing from the shoulders, the feet from the pelvis, while the intervening parts are either wanting or merely rudimental. It is an arrest of development often dependent upon hydrocephalus or spina bifida." The monster herein described was born of a single woman. She gave a history of five months' amenorrhea and complained of bleeding from the uterus for four days. On examination the uterus was of the size of a pregnancy of three and a half months. A monster was expelled within a few hours, and the fully formed placenta showed no gross abnormality. There was no history of dropsy in the mother.

The external form of the fetus immediately suggested that it was a case of phocomelus combined with cystic elephantiasis. The fetus had the form of an ovoid sac, 11 cm. long by 7 cm. wide (Fig. 1); the skin was macerated and only a small area of skin over the frontal area showed the pattern of lanugo. The head was large and occupied almost one-half of the total length. The eyes were open so that the greater portion of the lens was visible between the straight margin of the upper lid and the semicircular margin of the lower lid. The frontonasal process extended downwards between the eyes and presented in its upper portion a broad nose with two open nostrils set well apart; in its lower portion the process terminated as a broad process comparable to that which is seen in certain cases of double harelip. The mouth was represented by a Y-shaped slit, and there was no trace of a chin below. The short lateral limbs of the "Y" extended between the frontonasal process and the right and left maxillary processes; the vertical limb extended below the frontonasal process and separated the two maxillary processes. Below the outer canthus of the left eye at a distance of 3 mm. was a small pit-like depression which showed a small blind canal 1 mm. in diameter and 2 mm. deep. There is a small depression in the skin of the right side, somewhat more laterally placed, but there is no blind canal. The right and left ears are absent, and it is suggested that these depressions mark the site of the external auditory meatus. Two small elevations lie on either side of the vertical limb of the Y-shaped mouth, but no suggestion can be made as to their significance. There is no bone or cartilage therein.

The umbilical cord is dilated for 2 cm. in its proximal part, and is deeply stained with bile pigment from the contained loop of intestine. The cord contains two hypogastric arteries and one umbilical vein. The limbs are represented by flipper-like hands and feet arising directly from the trunk. The hands arise from the anterolateral aspect of the trunk about 7 cm. from the vertex; the right hand occupies the normal embryonic position with the large thumb preaxially placed, and the second, third and fourth digits are completely fused. All the digits have well-formed nails. The feet are placed terminally so that the soles look anteriorly and the little toes

touch one another in the middle line. The great toe is widely separated from the other four toes which are partly fused; the nails are well formed. Near the posterior extremity of the trunk on the ventral extremity is a small genital tubercle about 2 mm. long and 0.5 mm. in diameter with a small anus immediately posterior thereto. There is no trace of a scrotum or median raphe.

The radiogram (Fig. 2) shows a markedly abnormal vertebral column consisting of a double chain of about twenty paired centers of ossification which are partly fused. There is no resemblance to the orderly arrangement, in three columns of centers and lateral masses, which is seen in the normal. There is no trace of a skeleton in the upper limb girdle but the humerus appears as a roughly cylindrical piece of bone about 7 mm. long and 1 to 2 mm. in diameter. The hand displays a number of

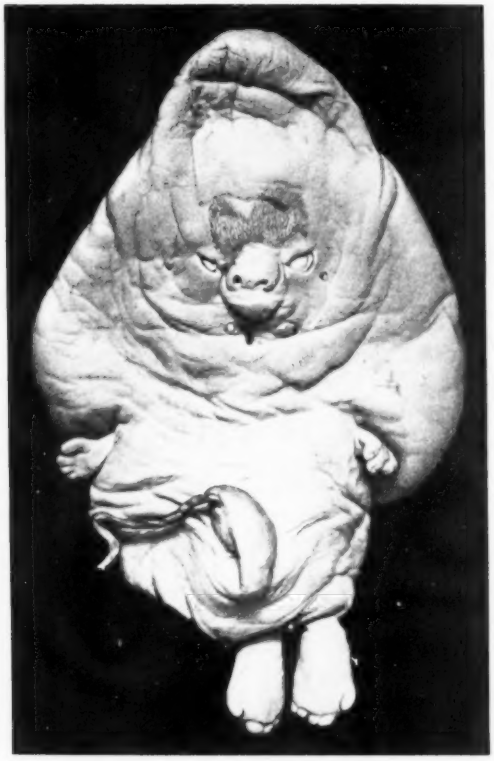

Fig. 1.—Anterior aspect of fetus after considerable shrinkage in alcohol.

centers of ossification which do not admit of ready reconstruction in terms of metacarpals and phalanges. The bony radius and ulna are absent. The lower limb girdle and femur are absent, but there is a pair of bones in the hind end of the fetus which may represent the left and right tibiae. Each bone is about 7 mm. long by 1 mm. in diameter. There is no trace of a second bone. The bones of the feet display an arrangement which is almost as irregular as the hands. The fact that both the metacarpals and metatarsals together with all three phalanges in some of the digits are ossified indicates that the age of the specimen is well over one hundred days.

The skull is expanded and occupies one-half of the total length of the fetus. The radiogram shows a large center of ossification for the body of the sphenoid in the

midline. This center is about 2 mm. long by 3 mm. wide. On either side are paired centers for the small wings and, extending more laterally, are the centers for the large wings of the sphenoid. The two frontal bones are ossified and the supraorbital ridges are very distinct. The supraoccipital is ossified and the two centers which lie lateral to the lateral extremities of the great wings of the sphenoid on the radiogram are the centers for the superior maxillae; there are also two small spurs of bone in the tip of the frontonasal process and they appear to represent the premaxillae. The remainder of the cartilaginous base of the skull has failed to ossify.

The skin on the back of the fetus was incised in the midline and there appeared a series of cysts in the subcutaneous tissues. The cysts varied in size and contained

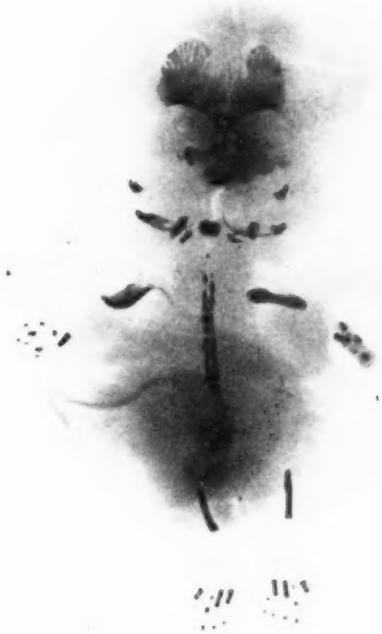

Fig. 2.—Radiogram of the Phocomelus.

clear fluid and a certain amount of curd-like material. A large cyst spread over the vertex and some of the dorsal cysts spread around the trunk and communicated with cysts on the anterior abdominal wall. The walls of the cysts were smooth and shiny with occasional patches to which were attached flakes of lymph; section showed them to resemble microscopically the condition seen in a typical lymphangioma or cystic hygroma.

The umblical hernia contained 4 cm. of intestine distended by meconium (Fig. 3). The walls were friable and deeply stained with pigment. There was some plastic lymph adherent to the intestine, so suggesting that the herniated gut had become strangulated. The returning loop of small intestine left the sac and after a course

of 5 mm. joined the cecum, which, with the appendix, lay to the left of the midline (Fig. 4). There was no trace of a Meckel's diverticulum, and nothing abnormal was noted in the liver and biliary apparatus. The stomach was small and empty, the anterior and posterior walls being in contact; the spleen and diaphragm were normal. The kidneys, suprarenals, ureters and bladder were normal in position, but the kidneys showed no trace of that lobulation which is normal to a fetus of this age. The testicles are situated at the internal abdominal rings, the head of the epididymis resting on the lateral and cranial aspect of the testicle. The left testicle is shown to the left of the appendix (Fig. 4). Whereas the suprarenal arteries arise from the abdominal aorta just before its bifurcation, the renal arteries arise from the anterior aspect of the umbilical arteries 6 mm. beyond their origin. There are no accessory renal arteries.

On opening the thorax in the middle line it is seen that there is no trace of a bony or cartilaginous skeleton, neither ribs nor sternum. The heart lies entirely to the left of the midline and there is no trace of the left lung or pleural sac; the

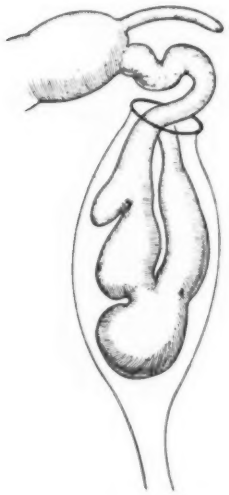

Fig. 3.—Umbilical hernia.

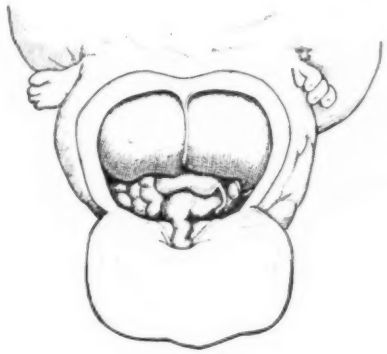

Fig. 4.—The abdominal contents with testicle to left of left-sided appendix.

right lung and pleural sac is normal except for its encroachment on the midline. The heart displays a bifid apex and the interventricular groove is placed so that the area of the left ventricle visible from the front is as extensive as the area of the right ventricle. The right and left auricular appendages meet on the anterior aspect of the single pulmonary aortic trunk which arises from the cranial border of the ventricles so as to be more closely associated with the right ventricle than the left (Fig. 6). The aortic arch is right-sided and gives off in turn the left innominate, the right common carotid, and right subclavian arteries. The right pulmonary artery arises at the convexity of the arch and passes in front of the descending aorta to the right lung. There is no trace of a left lung or left pulmonary artery. The common pulmonary aortic trunk presents a right and left sinus of Valsalva, with openings for the two coronary arteries and there are three semilunar valves arranged as posterior and right and left lateral. The interventricular septum lies in the sagittal plane and has a free fleshy margin which does not extend up into the pulmonary aortic trunk, but reaches to within 4 mm. of the semilunar valves. The auricular septum was widely deficient.

The Y-shaped mouth was seen to be quite separate from the nose, the choanae being completely stenosed. The nostrils opened into two lateral nasal cavities which were separated by a distinct cartilaginous septum. The lateral walls of the nose showed faint ridges corresponding to the primitive folds of the inferior conchae. There was no communication between the nose and the mouth or pharynx. The roof of the mouth presented two small elliptical anteroposterior depressions on either side of a median ridge which reached down towards the floor of the mouth for a distance of 3 mm. and extended posteriorly for a distance of 6 mm. Lateral to these depressions on either side was a ridge which represented the incomplete secondary palatal processes. The floor of the mouth had no obvious tongue or lower jaw. On section in the midline, however (Fig. 5), a rudimentary tongue and epiglottis were seen, and notwithstanding the absence of any cartilaginous or bony trace of the mandible yet there was a distinct cartilaginous hyoid and thyroid cartilage; the cricoid was not present but the trachea showed the normal arrangement of cartilaginous rings. The trachea led to a single right bronchus, and there was no trace of a

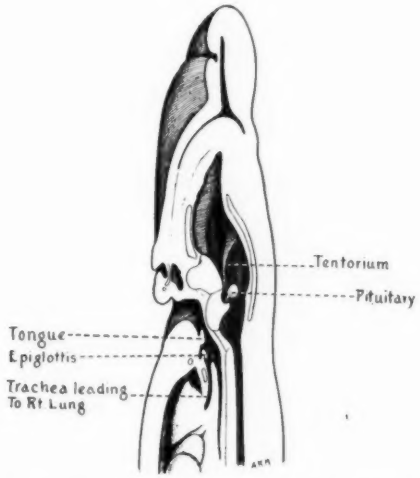

Fig. 5.—Median section of fetus, showing absence of the choanae, rudimentary tongue and epiglottis; and the pituitary gland in situ.

depression or diverticulum to suggest the left bronchus. Dorsal to the trachea was the esophagus which narrowed rapidly at the level of the right bronchus. The diameter of the gut beyond this point was less than 0.5 mm. and only a very fine probe could be passed. The distal 5 mm. of the esophagus was of normal caliber and led into the small stomach.

The specimen was sectioned in the midline from vertex to rump and the cranial cavity and spinal canal were found to contain a greyish mass of coagulum and disorganized nerve tissue. The meninges, especially the dura, were recognized and the cranial nerves and many of the spinal nerves could be distinguished although their diameter was much reduced. All the cranial nerves were identified and about twelve pairs of the spinal nerves could be recognized in the proximal part of their course. The section of the skull confirmed the interpretation of the radiogram and the pituitary gland was situated on the flattened sella turcica in relation to the ossified body of the sphenoid. The well-developed tentorial fold attached to the free border of the petrous bone served as a landmark (Fig. 5), and aided in the recognition of the foramina of exit of the spinal nerves.

ANATOMIC CONSIDERATIONS

The attempt to associate any particular form of malformation of the fetus with a definite period of time in the antenatal cycle is still without definite result. The theory of the special nociceptivity of the fast growing tissues, whereby the stress of an injurious stimulant falls upon that tissue or tissues which at that moment is undergoing most rapid differentiation and growth, has indicated a line of research which is of some value. The more recent attempt to associate each deformity with a particular interference with the processes of oxidation in the embryonic tissues may give more productive results when more is known of the normal and pathologic placenta and of the nutrition of the fetus.

(A) *The Skeletal System.*—As regards the skeletal deformities in this case, the absence of the clavicle and mandible,—the first two bones to appear in membrane,—is suggestive; especially as it is associated with the absence of the ribs and lateral masses of the vertebrae, which appear soon after. This suggests that during the thirty-ninth to the forty-fifth day the embryo was the victim of unfavorable conditions. On the other hand, the presence of an ossified humerus, and of well-marked frontals makes it hard to adopt this explanation, unless the particular instant of onset of bony deposition is subject to a very high degree of timing. Moreover, the absence of the radius, ulna, and fibula is difficult to interpret on this score. It is possible that with an underlying dilatation of the neural canal the extent of deformity may be determined by the distance of a given structure from the central axis so that whereas the ossification of the hand and foot has proceeded to some extent after normal fashion that of the more proximally placed pelvic girdle, shoulder girdle, and vertebral column has suffered more severely, by reason of the pressure from the dilated neural canal.

The radiogram (Fig. 2) shows that the lateral masses of the vertebra have failed in the whole extent of the column. In the normal embryo[2] the center for the lateral masses first appear in the upper cervical region and gradually extend from above downward. These for the centra appear in the lower dorsal region and extend cranially and caudally; the first centra of the lower dorsal region appear at a time when the centra for the lateral masses have extended to the lower lumbar region. It appears then that in the particular embryo concerned the centers for the lateral masses failed to appear in the cervical region at the same time, or possibly for the same reason which interfered with the appearance of the ribs, clavicle, and mandible. The irregularities of the centers for the centra of the vertebra, consisting of duplication in a given segment and fusion in the main axis may be attributable to the general dilation of the central canal and so falls into series with the irregularities of the limb girdles and limbs.

(B) *The Circulatory System.*—The outstanding anomaly of the circulatory system (Fig. 6) of this case is the defect of the aortic system, with persistence of the truncus arteriosus. The common trunk is more closely related to the right ventricle and rides above the free margin of the defective ventricular septum in such a way that blood from the right ventricle passes directly into the common trunk, whereas blood from the left ventricle passes to the common trunk by way of the defect in the base of the ventricular septum. This common trunk has three semilunar cusps and two normal coronary arteries arising behind two of these. At first sight it seems improbable that a persistent aortic trunk should possess three cusps, in view of the usual account of the formation of the cusps of the aortic and pulmonary valves. It is interesting to note that the case of persistent aortic trunk described by Dr. Maud Abbott[3] also had three cusps, whereas the case described by Preiz[4] had four cusps. In thirteen cases of this condition collected by Dr. Abbott, twelve were associated

with defect of the ventricular septum, six with defect of the auricular septum, eight with right-sided aortic arch, and in two cases there were associated anomalies of the vessels or other systems.

In this case there is not only a defect of the septum of the ventricle, but there is also the absence of the left lung and left pulmonary artery. Normally, the truncus arteriosus is divided into the two great efferent vessels by a septum which is derived from three distinct parts; viz., the distal and proximal endocardial bulbar swellings and the aortopulmonary septum proper, which appears in the lumen of the trunk at

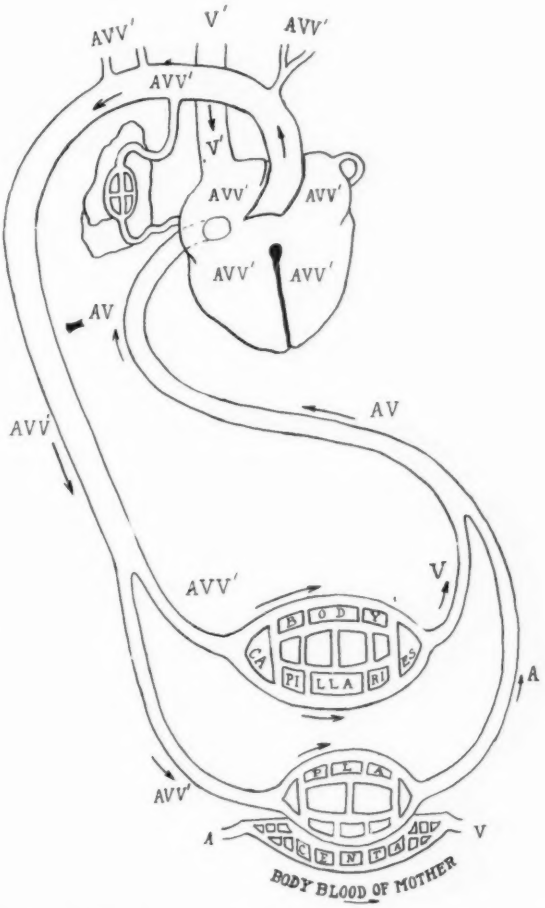

Fig. 6. Schema of the circulation of the Phocomelus fetus.

the point of junction of the fourth and sixth arches. The presence of a fourth and sixth right arch in the specimen is difficult to account for since the fourth and sixth left arches together with the aortopulmonary septum are absent. In a previous case[5] of absence of the left lung there was no trace of a left pulmonary artery, although there was present a right aortic arch (fourth) and an abnormal left aortic arch which was probably the sixth. Bremer[6] has shown that the right pulmonary arch in man is made up of two elements, the sixth arch and the pulmonary outgrowth, whereas on the left side the pulmonary consists of the outgrowth only, the corre-

sponding proximal portion of its sixth arch having been assimilated in the pulmonary trunk. It is possible that the left pulmonary arterial outgrowth appears later than the right, in accordance with the appearance of the left lung anlage at a later date than the right, as described by Blisnianskaja.[7] His[8] shows a 4 mm. embryo in which the paired diverticula of the pulmonary anlage lie immediately above the auricle of the heart. The 5 mm. embryo of His shows the diverticula growing dorsally and passing downwards so as to pass beneath the ducts of Cuvier. At this time the mandibular arch is in contact with the heart, whereas the frontonasal processes and small maxillary processes are not in contact with the heart. There is a temptation

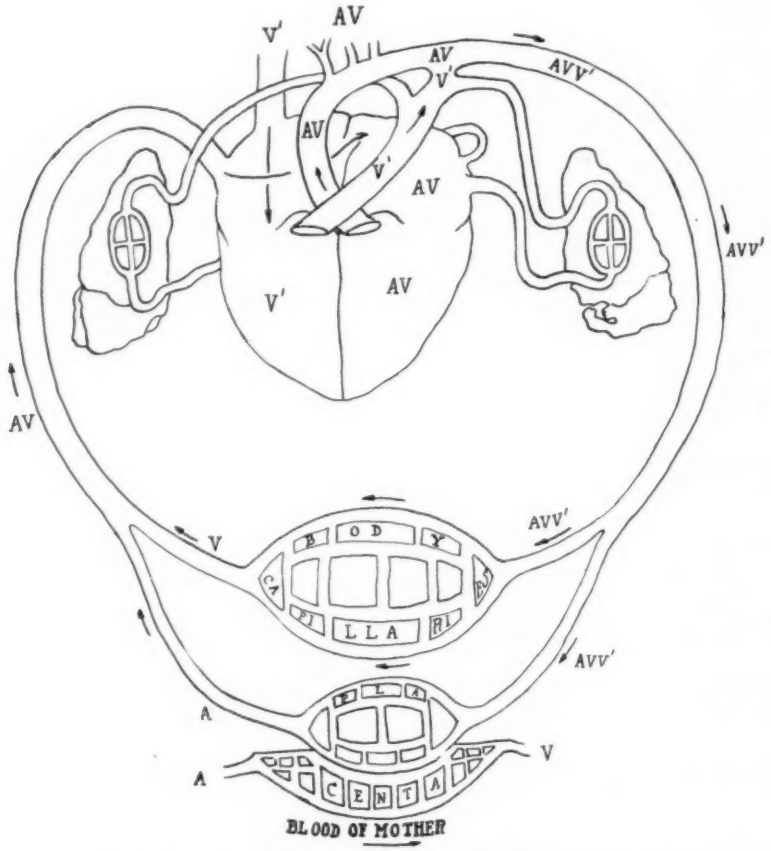

Fig. 7.—Schema of the circulation of the normal fetus at term. (Modified after Dr. Maud Abbott.)

here to revert to the older mechanical theories of von Baer[9] and suggest that at such a time, an excess of the natural torsion of the embryo combined with the dilatation of the neural canal might cause apposition, pressure, fusion, and absorption of the mandibular process, left lung, left sixth aortic arch; and also cause the irregularities of the septa of the heart.

The schema given by Dr. Abbott (Fig. 7)[10] for the circulation in the normal fetus shows that the blood reaching the head and neck via the main branches of the aorta is made up of blood returning from the body capillaries (*V*) and the blood returning from the umbilical vein (*A*). We may represent this as mixed blood

(*AV*). In the schema of the phocomelus (Fig. 6), the blood reaching the head and neck is a mixture of the blood from the capillaries of the body (*V*), blood from the umbilical vein (*A*) and blood from the head via the superior vena cava (*V'*). We may represent this blood by (*AVV'*).

Is this increased venous character of the blood reaching the head in the second case a factor in the production of the cystic condition of the embryo, with marked generalized distension of the lymphatic spaces, everywhere except in the small flipper-like hands and feet? Starling[11] has shown that the protein content of the lymph differs in various parts of the body, and is lowest in the extremities. It appears, therefore, that proteins which are able to exude from the capillaries may also transude into the lymphatics and there hold a large volume of fluid, so producing the general cystic condition. It is suggested that the increased venosity of the blood to the head of the phocomelus has produced that lack of oxygen supply to the capillaries which has led to the dilatation of the lymphatic spaces. On the other hand, if we accept the description of the fetal circulation which was given by Harvey and revived lately by Pohlman,[12] and agree that the blood of the two auricles is normally mixed blood, then this explanation of the cystic condition does not hold good. If the blood mixes in the auricles then all the chambers of the heart contain blood which will be represented by (*AVV'*). It is not wise to regard a theory of the production of the cystic condition as an argument against the theory of Harvey, but it certainly does point to the need of confirming the experimental evidence brought forward by Pohlman.

As regards the lymphatic system it is important to note that according to Sabin[13] and Lewis[14] lymph sacs are first visible in the human embryo in the sixth week (10 mm.), and the valve between the lymph sacs and jugular veins appears in the seventh week. The relationship of the maldevelopment of the lymphatic system of this fetus to the maldevelopment of the circulatory system is obscure; but it is particularly interesting to note that both systems are subject to particularly rapid changes during the sixth and seventh week of intrauterine life. The condition of the specimen did not allow of an accurate examination of the lymphatic system.

(C) *The Vascular Supply of the Urogenital System.*—The origin of the renal arteries from the umbilical arteries is a rare anomaly, as these arteries are not accessory to renal arteries arising from the abdominal aorta. Accessory renal arteries have been described as arising from the inferior phrenic, the spermatic, a lumbar artery, the inferior mesenteric, from the bifurcation of the aorta, or the middle sacral artery, from the common iliac and very rarely from the internal or external iliac. Portal found in one instance the right and left renal arteries arising by a common trunk from the forepart of the aorta. The earliest attempt at depicting the variations of the renal vessels is in the tabulae anatomicae[15] of Eustachius, published in 1564. The lowest of three cases shown is that in which Eustachius shows an accessory renal artery on the right side arising from the internal iliac and an accessory artery on the left side arising from the common iliac.

According to Felix,[16] the accessory renal arteries are to be regarded as persistent mesonephric arteries. On the other hand Eben Hill,[17] in a study of the vascular system of the wolffian body and kidney in pig embryos, shows no communication between the umbilical arteries and the renal and mesonephric arteries, all of the latter arising from the abdominal aorta. It is true that the stage which he depicts is a relatively late one, from 28 mm. onwards, when the renal artery is first seen penetrating the kidney. In a study of the vascular system of the Pfannenstiel embryo, III, (2.6 mm.), Felix has drawn attention to the marked development of the peri-intestinal rete and the rami intestinales at the point where the umbilical arteries arise from them; i. e., before the latter possess their definite origin from the aorta.

Felix points out that the primitive mesonephric arteries are dysmetameric and recede from the thoracic segments to the lumbar ones. The extent of this migration is so marked that as many as four arteries may lie in one of the lumbar segments with as many as thirty arteries in all supplying about eighty nephric tubules. These arteries become divided into three groups. The first or cranial group of arteries run dorsal to the suprarenal body; the second group pass through the suprarenal body, and the third or caudal group pass in front of the suprarenal bodies. The more caudal of the latter group pass distal to the suprarenal body. The first group usually gives rise to the inferior phrenic artery; the second gives rise to suprarenal and testicular or ovarian arteries; the last vessel of the second group or the first of the third group gives rise to the definitive renal artery of the adult. Since the mesonephric vessels are not segmental, and since they are characterized by a caudal migration which causes several of them (the most caudal of the third group of Felix) to lie caudal to the large suprarenal of the 20 mm. embryo, it is clear that the anomalous origin of the renal arteries from the umbilical arteries may be explained in the following manner. When the mesonephros of this particular specimen was growing caudally, the atrophy of the cranial tubules was markedly increased by the general hydrocephalic and cystic condition so that the migration of the mesonephric arteries passed beyond the usual limits and the number of arteries in the third group of Felix was increased. There was, in particular, a marked increase of the more caudal members of this group so that they came to take origin from the umbilical arteries. One of these arteries has persisted as the definitive renal artery in this case, and there is no trace of a more proximal renal artery. In other words the definitive single renal artery of this case is the artery which has so frequently been described from the time of Eustachius onwards as the accessory renal artery of adult anatomy. Thane[18] gives the frequency of an accessory renal artery arising from the common iliac as 1 per cent, and the frequency of the condition in man as compared with its rarity in domestic animals is quite in keeping with the distribution of other vascular anomalies in man and animals. It was noted that the origin of the anomalous renal artery was from the ventral aspect of the umbilical artery, and not from the lateral aspect. Felix has described very minutely the characteristics of the migration of the origins of his three groups of mesonephric arteries and says: "The vessels of the first or dorsal group shift their origins to the dorsal surface of the aorta, those of the third group to the ventral surface, and only those of the second group preserve their original lateral position." Thus, the origin of the anomalous renal artery from the ventral aspect of the umbilical artery confirms the view that it corresponds to one of the distal members of the third group of Felix.

PATHOLOGIC CONSIDERATIONS

The curious monstrosity known as congenital cystic elephantiasis is probably related to general fetal dropsy and to that postnatal condition which is called cystic hygroma of the neck. The published cases have generally shown the mother to be a multipara, the pregnancy always ending prematurely with or without hydramnios, dropsy and albuminuria in the mother. There is always a lymphangiectasis of the skin, but it is not possible to say whether this is a primary condition as there is always an associated defect in the heart with or without umbilical hernia. The case described by Lindfors[19] displayed a common ventricle, common auricular-ventricular opening and incomplete auricular septum. There is no method of definitely stating

whether the lymphatic defect is primarily due to an error in the formation of the primitive lymphatic system or whether it is secondary to the defect in the vascular system. Yet it is important to note that most of the defects of the vascular and respiratory system as well as those of the skeletal system fall within that period of time which is also the critical period in the lymphatic system and in its union to the venous system. There is not necessarily any association between the phocomelus condition, and the generalized cystic condition; for in Ballantyne's case[20] the phocomelus was associated only with defective ossification of the frontal bones whereas Baxter Tyrie's case[21] showed phocomelus in association with umbilical hernia, diaphragmatic hernia, left inguinal hernia, cleft palate, incomplete interventricular septum and spina bifida in the dorsolumbar region. Most cases of phocomelus show some traces of the proximal segments of the limb and on the whole the lower limb tends to be more regularly developed than the upper. It is not possible to bring forward any evidence as to the extent to which phocomelus is related to such general conditions as achondroplasia with its dwarfing of the limbs or to localized conditions, such as amelus or hemimelus.

CONCLUSIONS

The association of two conditions, such as phocomelus and general cystic elephantiasis in one and the same fetus is decidedly rare, particularly as the former condition may exist without anomalies of the other systems, whereas the latter is invariably associated with multiple anomalies of the vascular, urogenital, and alimentary systems. The skeletal anomalies of the specimen, apart from the presence of an ossified humerus, suggest that the conditions of nutrition of the embryo were unfavorable during the sixth and seventh week of embryonic life. The failure of the secondary palatal processes, the rudimentary tongue and absence of the left lung are all associated with the sixth week. The anomalies of the heart, arterial system and lymphatic systems also fall into this period. It is true that the hydrocephalus, dilated spinal canal, and irregularities of ossification of the vertebral column may be only late manifestations of peculiarly nociceptive conditions during the precartilaginous and cartilaginous periods; but as a rule, such early errors in development, occurring before the sixth week, are manifested by some degree of anencephaly, iniencephaly, and gross errors in the cervical and lumbodorsal region. That is to say, that the head and tail bends of the embryo are regions peculiarly liable to display gross deformity during the third to the sixth week of embryonic life.

No causal relationship between the phocomelic and general cystic condition can be put forward; nor can any suggestion be made as to

the nature of the nutritional disturbance in the mother or fetus. The time factor, from a consideration of the associated anomalies, points to the sixth and seventh week as the period when the growth of the embryo was severely interrupted.

My thanks are due to Dr. T. B. Davies, of Queen Charlotte's Hospital, who so kindly obtained the specimen; to Miss Russell and Mr. Maxwell, who executed the drawings, and to my colleagues at University College and Washington University.

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JANICEPS ASYMMETROS, WITH THE REPORT OF A CASE

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THE name Janus is derived from the two-faced Roman god Janus, to whom the month of January was sacred. Janus monsters are rather frequent. Licetus reported one in the year 1668.

Of the disomata, the terata with which we are concerned are the terata anadidyma. These monsters in general have united cephalic poles and divergent caudal extremities, producing a fetus which is more or less single above and plural below.[1] In syncephalus or syncephaliens there is a fusion of the head and trunk. The types of Syncephali are Janus monsters, which are either symmetrical or asymmetrical. The monstrosity reported herein is called janiceps asymmetros. The asymmetry is caused by the fact that the two axes of the body are not exactly parallel, but inclined to each other at an angle so that the well-formed face is composed of the left head, which projects anteriorly, giving the aspect of a single countenance to a more or less double body. The malformed and opposite face is the asymmetrical side and is produced by an abortive development of the median portion of the anterior surface. Hence the janiceps asymmetros possesses a perfectly developed face on one side, whereas the opposite face is very rudimentary and portrays varying degrees of fission.

A synonym for the prozygotic Janus asymmetros is the term Janus ateleus, which is occasionally used. The Janus monster is also a type of cephalothoracopagus and of the dihypogastric monsters. Moreover, it also belongs to the omphalopagi or monomphaliens, implying the possession of a common single navel and umbilical cord by the two component individuals of the monster.

REPORT OF A CASE OF JANICEPS ASYMMETROS

This monster was born of normal young white parents. The mother was delivered by Dr. W. C. Gewin, of Birmingham, Alabama, to whom we are indebted for this fetus. Double monsters are practically never diagnosed until the onset of labor, except probably in those clinics where roentgenograms are taken, although a multiple pregnancy is sometimes suspected.

The delivery of this monster was spontaneous. The vertex presented. The Janus monsters of Commiskey and of Sterley were spontaneously delivered with the vertex presenting.[2,3] One factor that prevents a possible dystocia is that this type of monster rarely goes to full term, hence the entire monster is seldom larger than a normal fetus at term. This fetus was born at the completion of the eighth lunar

month of gestation. Keibel and Mall have stated the essentials for uninterrupted uterine development as follows: "The embryo must not be extreme enough to eliminate the heart, and the chorion must be normal enough to permit the formation of a healthy placenta which begins to differentiate at the end of the second month." Even before the expiration of the second lunar month, gross errors of development can be easily discerned. Marchand claims that 0.6 per cent of all births are monsters. A great number of the early abortions may be of monstrous embryos. The monster was a stillbirth. Janiceps, even at full term are not viable for any length of time. Both individuals of the double monster were of the female sex. It should be recalled that all homologous twins are of the same sex.

Fig. 1.—View of well-formed face.

The father and mother were the parents of three healthy well-formed children. There was no history of venereal disease. Family history records that no malformations of any kind existed among the known members of the maternal and paternal families.

There are certain facial malformations associated with cyclops. Usually with a defect of the anterior portion of the plastic material for the chorda dorsalis, there is an arrested development of the first branchial arch and cleft. Consequently, accompanying cyclopia there is found a synotia, agnathia, astomia and other deformities. These deformities commonly occur together, and when they do, the face is called Cyclops hypoagnathus (Cyclotia), or Edocephalians.

The nose of this cyclopian face is markedly changed because the frontonasal

process is defective. The nasal rudiment was found in the middle of the forehead in the glabellar region, above the single eye (Fig. 2). This nasal proboscis is tiny, rudimentary, solid, pedunculated, and slightly constricted at the base. Histologic sectioning reveals no vestiges of mucous membrane, nasal canals or cartilages. The interior is composed of connective tissue, fat and smooth muscle. The nose is covered by normal epidermis. Above this nose and extending downward and laterally are two slightly pigmented lanuginous areas, which are of normal contour and which appear to be the eyebrows. This brevity of the nasal prominence (brachyrhynchus) has been explained as due to the deficiency of the intermediate jaw bones.[10] The absence of the nasal fossae can be explained by the fusion of the superior maxillary

Fig. 2.—View of the malformed face.

processes and consequent disappearance of any of the structures which normally would have intervened.

The eye of the cyclopian face is single. Cyclopia may at times show all the variations of fusion of the two optic vesicles, i. e., there may be two eyes in a single orbit or the two eyes may fuse until they are single. There is a single cornea, one lens and one optic nerve. There is no optic chiasm, but a single optic tract entering the cranium through a single optic foramen. This optic tract represents the fused bilateral components. Ordinarily the fused eye is larger than a single normal eye, but in our specimen the eye is smaller (microphthalmus). The palpebral aperture is triangular in outline. The upper eyelids are not fused. The lower eyelids are represented by a single lid, in the middle of which is a single lachrymal caruncle and papilla. The single eye is much larger than it appears in the illustration (Fig.

2—beneath rudimentary nose). The palpebral aperture is small (blepharophimosis). The internal recti muscles are absent. There is one external rectus muscle at each lateral angle of the eye. There are several superior and inferior muscles of the eyeball, which could not be identified.

The orbit is single and there is an absence of the bones that normally intervene between the two orbits.[13] Ballantyne[16] states that in cyclopia, "the orbit is bounded above by the frontal bones, at the sides by the malars and greater wings of the sphenoid, and inferiorly by the fused orbital plates of the superior maxillae (without the nasal process). At the fundus of the orbit is a rounded opening bounded by the malformed lesser wings of the sphenoid, by the sella turcica and by the frontal bone; through this foramen comes the optic nerve." We verified the entrance of the optic nerve.

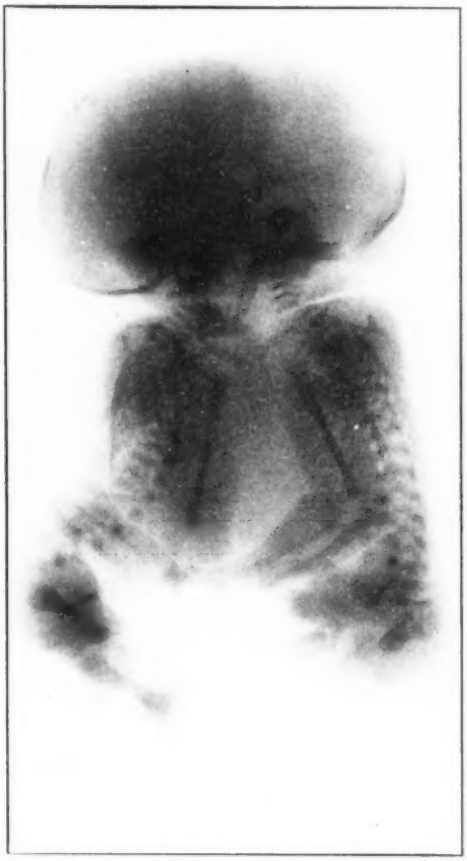

Fig. 3.—Roentgenogram. Anterior view of well-formed face.

Some of the bones of the malformed or cyclopian face are lacking, viz., nasal, vomer, lachrymal, ethmoid, inferior turbinate, palatine and the pterygoid process.

The mouth and lower jaw of the cyclopian face are absent. We have previously mentioned that in those instances when the frontonasal process and the first pair of branchial arches are aplastic that the complex deformity which results is known as Cyclops hyponagnathus. Not the least obnoxious of these is the absence of the lower

jaw (agnathia) and the absence of the mouth (astomia), which are the conditions found in this specimen. A complete agnathia is rare.

Otocephaly or synotia (approximation or fusion of the ears beneath the skull) is another concomitant of the cyclopian deformities. Etiologically, the same theories have been applied to it as to the synophthalamus; (1) incomplete development of brain (medulla oblongata) permitting the coalescence of the auditory vesicles (Dareste)[16] and (2) arrested development of the first branchial arches (Blanc),[16] (Bischoff) permitting approximation beneath the skull. The ears of the malformed face have not completely united, as there is a narrow strip of skin intervening (Fig. 2). A probe passed through each middle ear opens into the common pharynx. The connection between the single pharynx and each middle ear is almost too short to be called an Eustachian tube; the middle ear is practically continuous with the pharynx.

In Fig. 2, just below the single eye, there is a slightly oval projection which is covered by a thick, heavy skin supplied with fine lanugo hairs. Beneath this is a serous membrane forming a sac, which contains a debris of necrotic tissue very similar to brain substance. The serous coat is a continuation of a process from within the skull. We were inclined to call this an encephalocele, because of the character of the débris it contained. The sac was heavily pigmented which we interpreted as

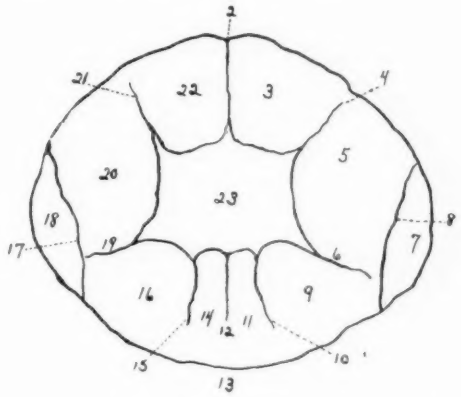

Fig. 4.—Upper aspect of the skull. Calvaria seen from above. *1*, Side of well-formed face; *2*, metopic suture; *3*, frontal bone; *4*, coronal suture; *5*, parietal bone; *6*, sagittal suture; *7*, occipital bone; *8*, lambdoid suture; *9*, parietal bone, *10*, coronal suture; *11*, frontal bone; *12*, metopic suture; *13*, side of malformed face; *14*, frontal bone; *15*, coronal suture; *16*, parietal bone; *17*, lambdoid suture; *18*, occipital bone; *19*, sagittal suture; *20*, parietal bone; *21*, coronal suture; *22*, frontal bone; *23*, octagonal fontanelle.

a possible melanin deposit in the meninges. Furthermore, Planchon and Taruffi individually have reported instances where cephalocele accompanied cyclopia.

The vertex of the calvarium is abnormal (Fig. 4). This illustration portrays the odd configuration of the calvaria. There are no posterior fontanelles, but the two anterior ones are represented by a large octagonal fontanelle. The proportionate size of allotment of the cranial bones to the faces is well shown. The metopic sutures are present in both frontal bones. The occipital bones are placed laterally to the faces, as are the cerebelli. In our description we have oriented all the structures in relation to the two faces.

The cerebra of the Janus monster were in such a necrotic state that they permitted little more than a cursory examination. There are two cerebra, one for the well-formed face and one accompanying the cyclopian face. The latter brain is rudimentary. The cerebral surface is smooth and only slightly marked by gyri or sulci. The rudimentary brain is not divided into hemispheres, but is a single small lobe,

divided from the larger and more perfectly developed brain by a fissure, which we are pleased to call the intercerebral fissure. This single lobe possesses no falx cerebri, sagittal fissure, olfactory lobe, corpus callosum, septum pellucidum, etc. A single internal cavity represents the ventricles. The larger brain, although more normal, is as yet not completely developed. The temporal, frontal and occipital lobes are well marked out. There are two brain stems.

The base of the skull can be arbitrarily divided into two sections for description, according to the allotment for occupancy by the two different brains. (See Fig. 5.)

On the well-formed side, the squamous portion of the temporal bone, the orbital process of the frontal bone, the crista galli and the ethmoid plate are normal in structure and in position. The middle fossae are normal except that the petrous portions of the temporal bones form parts of the floors of the middle fossae instead of the posterior boundaries. The tentorium cerebelli (both sides) is attached anteriorly to the petrous portion of the temporal bone and consequently forms a part of the floor of the middle fossa. The tentoria are also attached anteriorly to the anterior clinoid processes, and laterally (relative to the faces) the attachments are very high up on the occipital bones at the level of the lambdoid sutures. These

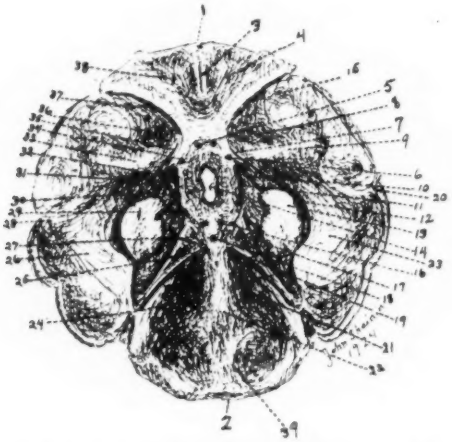

Fig. 5.—Base of skull seen from above. (Tentoria cerebelli and cerebella still in situ.) *1*, Side of well-formed face; *2*, side of malformed face; *3*, crista galli separating the two cribriform plates; *4*, anterior cranial fossa; *5*, two optic nerves for the well-formed face; *6*, right internal carotid artery (well-formed face); *7*, anterior clinoid process with tentorium cerebelli attached; *8*, middle cranial fossa; *9*, petrous portion of the temporal bone; *10*, abducent nerve; *11*, oculomotor nerve; *12*, free edge of tentorium cerebelli; *13*, brain stem; *14*, quadrilateral opening formed by the fusion of the two sellae turcicae; *15*, posterior border of the lesser wing of the sphenoid bone; *16*, left internal carotid artery (malformed face); *17*, abducent nerve (malformed face); *18*, single optic nerve for malformed face; *19*, anterior clinoid process with tentorium cerebelli attached; *20*, internal occipital protuberance (torcular herophili); *21*, middle cranial fossa; *22*, fused orbital plates of frontal bones forming a saddle-shaped ridge; *23*, superior surface of tentorium cerebelli; *24*, middle cranial fossa; *25*, anterior clinoid process with tentorium cerebelli attached. The two anterior clinoid processes of the malformed side are almost fused. *26*, Superior surface of tentorium cerebelli; *27*, abducent nerve; *28*, internal occipital protuberance (torcular herophili); *29*, brain stem; *30*, free edge of tentorium cerebelli; *31*, abducent nerve; *32*, oculomotor nerve; *34*, petrous portion of the temporal bone; *34*, left internal carotid artery; *35*, anterior clinoid process with tentorium cerebelli attached; *36*, middle cranial fossa; *37*, posterior border of the lesser wing of the sphenoid bone; *38*, anterior cranial fossa; *39*, small anterior cranial fossae fused.

tentoria are exceedingly tough. They are located laterally, with relation to the faces, as are the occiputs and the cerebella. There are two tentoria, one for each brain. The optic foramina, optic nerves, oculomotor nerves, abducent nerves and internal carotid arteries are normal. The bodies of the two sphenoid bones have fused to make a single sella turcica. Within this sella turcica there is a quadri-

lateral opening which contains tissue, which we interpret as the hypophyses. The two posterior clinoid processes of the well-formed side are united with the two posterior clinoid processes of the malformed side to form a ridge on each side of the sella turcica. Relative to either face, these ridges run anteroposteriorly and lateral to the position of the hypophyses or immediately between the two brain stems. The tentoria cerebelli have free edges mesially where they come in contact with the junction of the brain stems and the cerebral hemispheres. The middle cranial fossae of this well-developed part are not separated by the sella turcica as normally, but because of their more anterior position, the intervening structure is the anterior clinoid process and the root of the ridge formed by the lesser wing of the sphenoid.

On the malformed side the crista galli and ethmoid bone are absent. The anterior cranial fossae as such are absent, but in place of them is a saddle-shaped prominence formed by the orbital processes of the frontal bones and extending back to the ridges of the posterior clinoid processes. The middle cranial fossae of this part are small and not separated by the sella turcica as normally, but because of their more anterior position, the intervening structure is the saddle-shaped prominence caused by the union of the orbital processes of the frontal bones. There are only one optic foramen and one optic nerve. There are two internal carotid arteries and two abducent nerves in their normal positions.

There are two cerebella, each of which is normal and located in the posterior cranial fossa. (Fig. 6.) These posterior cranial fossae are in the occipital areas and lateral to the faces. The trigeminal nerves are normal in position, relative to each cerebellum and posterior cranial fossa. There are two of these nerves on each side (Fig. 6). A very interesting phenomenon is that the well-formed face receives two trigeminal nerves, but each nerve is from a separate brain stem. The malformed face likewise receives one trigeminal nerve from one brain stem and the other half of the face is supplied by the trigeminal nerve from the opposite brain stem. This same anomalous distribution of cranial nerves is true for the III, VI, VII, VIII nerves, and possibly the IV but we are unable to confirm the trochlear distribution. The position of the posterior cranial fossae, the cerebella and the manner of distribution of the cranial nerves lead us to believe that each face is composed of elements from both of the fetal components. In other words, one-half of each face belongs or is continuous with the body on that particular side.

The single foregut is evidently common to the fetuses, since they also have the same pharynx, the same esophagus and stomach. The roof of the common pharynx is formed by a sac-like structure which is attached superiorly to the brim of the quadrilateral opening formed by the sella turcica. The pharyngeal outpocketing for the mouth of the malformed face is present but does not open externally as there is no oral plate. The mouth of the well-developed face opens into the single oral pharynx. The foregut evidently sprang from the anlagen of both feti, because the larynx is duplicated. The larynx of each side is normal and fully formed. The single common esophagus lies between the two larynges. (Fig. 7.)

The chests are fused above the umbilicus (thoracopagic). There are two nipples on each side. There is a sternum on each side of the body, directly under the face. The ribs extend from the sterni to the spinal columns which are laterally located, relative to the faces. The muscles of the pectoral regions are normal.

The single esophagus runs through the thoracic cavity to the diaphragm, piercing it.

The two larynges are continuous with two tracheæ and two sets of lungs. The lungs are situated in the thoracic cavity, in a location lateral to the faces or anterior to each spinal column. The lungs are normal but atelectatic.

There are two separate hearts each of which is two-chambered. These hearts are located in the central part of the thoracic cavity, mesial to the two sets of lungs, and immediately substernal. We believe that these two (two-chambered) hearts are not simply separated portions of the same single heart, but rather that they are separate rudimentary hearts. The atrium of each heart shows indication of two auricles, but the absence of the interauricular septum. Theremin has reported the absence of this septum accompanying cyclopia.

The heart on the well-developed side is a two-chambered heart. One large atrium and one large ventricle are present. The atrium and ventricle are larger than the opposite heart and evidently more actively functional. The atrium has two auricles or pockets, the cavities of which communicate. Only one semilunar and one atrioventricular valve are found. The semilunar valve has three cusps. The ventricular wall is very thick. The papillary muscles and chordae tendinae are normal. The

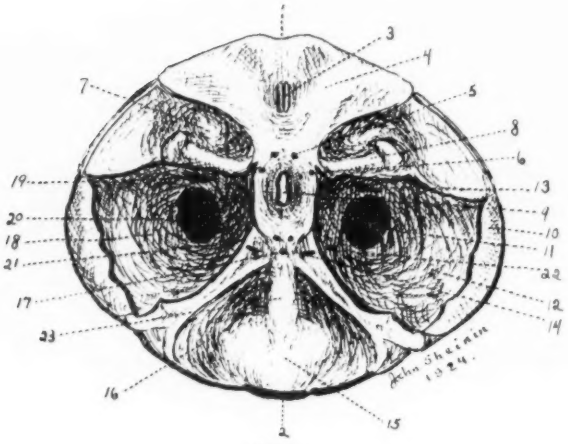

Fig. 6.

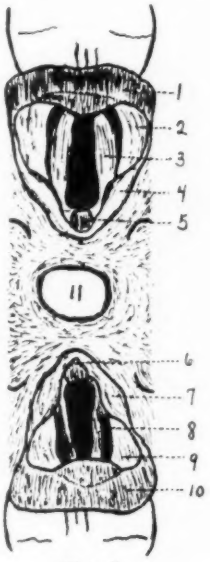

Fig. 7.

Fig. 6.—Base of skull seen from above. *1*, Side of well-formed face; *2*, side of malformed face; *3*, crista galli separating the two cribriform plates; *4*, anterior cranial fossa; *5*, two optic nerves for the well-formed face; *6*, right internal carotid artery (well-formed face); *7*, middle cranial fossa; *8*, petrous portion of the temporal bone; *9*, quadrilateral opening formed by the fusion of the two sellae turcicae; *10*, occipital bone; *11*, great occipital foramen; *12*, posterior cranial fossa (fossa for lodgment of cerebellum); *13*, right trigeminal nerve for the well-formed face; *14*, abducent nerve; *15*, small anterior cranial fossae fused; *16*, middle cranial fossa; *17*, single optic nerve for malformed face; *18*, posterior cranial fossa; *19*, left trigeminal nerve for well-formed face; *20*, great occipital foramen; *21*, right trigeminal nerve for malformed face; *22*, left trigeminal nerve for malformed face; *23*, fused orbital plates of frontal bones forming a saddle-shaped ridge.

Fig. 7.—Double larynx with interposed esophagus viewed from above. *1*, Epiglottis; *2*, false vocal cord; *3*, true vocal cord; *4*, cartilage of Wrisberg; *5*, arytenoid commissure; *6*, arytenoid commissure; *7*, cartilage of Wrisberg; *8*, true vocal cord; *9*, false vocal cord; *10*, epiglottis; *11*, esophagus.

aorta gives off four or five unidentified branches, one of which is continuous with the aorta from the opposite heart.

The heart on the malformed (cyclopian) side is also a two-chambered heart. One large atrium and one large ventricle are present. The semilunar valve is normal but the atrioventricular valve is atypical. A large vein entering the atrium is continuous with a large vein of the other heart. In other words, a venous arch is present,

which has tributaries. The artery is single and is continuous with the large artery leading from the other heart, hence an aortic arch exists between the two hearts. This aortic arch gives off subsidiary branches. There are two descending aortae.

This fetus is an omphalopagus because it possesses a single umbilical cord with a single artery and one vein. There is a hernia at the umbilicus, i. e., the area immediately surrounding the umbilical junction is not supplied with normal skin. The cord is eccentrically attached. Ballantyne has noted the occasional occurrence of an umbilical hernia and a single umbilical artery with cyclops.

There are two separate livers, connected by the diaphragm and lesser omentums. The livers are so arranged that the smaller of the two is on the side of the cyclopian face, and the larger one on the side of the well formed face. The livers are not normally shaped. The large liver possesses a gall bladder. In the small liver there is no falciform ligament or gall bladder present.

Only one large spleen was found. It was free and attached only to the stomach by the gastrolienal ligament.

The single stomach is continuous with the common esophagus. The stomach, duodenum, and a large part of the jejunum lie above the umbilicus and are situated between the livers. There is a single duodenum. The jejunum divides about half

Fig. 8.—Roentgenogram of left hand of malformed side.

Fig. 9.—Roentgenogram of right hand of malformed side.

way into two branches which continue out into the respective abdominal cavities of the feti. There are two appendices.

The kidneys, bladder, uterus and adnexa are all normal and bilaterally represented.

The right, less developed fetus has no umbilical artery. That is to say, the internal iliac is normal but gives no functional hypogastric artery to the umbilicus to enter into the placental circulation. The left fetus has one large hypogastric coming from the right internal iliac. This artery is very large and forms the umbilical artery (the single tributary).

On the side of the well-formed face the arms and hands are normal. On the side of the malformed face there are certain abnormalities. In both forearms, the ulna is one and a half times as long as the radius. This causes a marked abduction of the hands on the wrist, similar to the deformity produced by destruction of the distal epiphysis of the radius.

On the malformed side the left thumb is represented by a tiny papilla the size of a pinhead on the radial side of the base of the index finger. This agenesia or aplasia of the thumb is usually associated with an absence of its metacarpal and the radius, the malformation being known as radial ectrodactyly. The metacarpal is lacking but the radius is present. The right thumb is rudimentary and club-like. There are only four metacarpals.

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SEBACEOUS GLANDS IN THE HUMAN NIPPLE

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VARIOUS textbooks of anatomy and histology contain such statements as these: "These (sebaceous glands) are branched sacular glands which may be subdivided into classes, (1) those whose ducts open into the hair follicles, and (2) those whose ducts open upon the free surface of the epidermis. The former are by far the more numerous; the latter occur in the skin of the face, red margins of the lips, labia minora, glans penis and prepuce, and the tarsal glands of the eyelids. With the above exceptions the distribution of the sebaceous glands is coextensive with that of the hair."[1] "Sebaceous glands are found in some regions devoid of hairs, as in the margins of the lips, glans penis, prepuce, glans clitoris and labia minora."[2] "The distribution of the sebaceous glands in the skin is closely connected with that of the hair follicles into which they pour their contents. Exceptions to this rule occur in only a few regions of the body, as, for instance, in the glans penis and foreskin (Tyson's glands), in the labia minora, angle of the mouth, glandulae tarsales and the meibomian glands of the eyelids, etc."[3] In this group of observations there is no indication that sebaceous glands are found in the nipple.

In other texts we find the following statements: "In the region around the nipple sudoriparous and sebaceous glands develop, the latter also occurring within the nipple area and frequently opening into the extremities of the lacteal ducts."[4] "In the area around the nipple—the areola—numerous sudoriferous and sebaceous glands develop, some of which come to open into lacteal ducts."[5] "The nipple and areola contain also abundant sebaceous glands; and sweat glands are present in the periphery of the areola."[6] These statements indicate that sebaceous glands are present in the nipple and in two instances point out that they open into the lacteal ducts.

In a third group we find statements in which the authors have attempted to explain the presence of these glands. "Over both areola and nipple the skin is provided with large sebaceous glands, the secretion of which is increased during lactation and serves as protection during nursing."[7] "The corium of the nipple has many large vascular and nervous papillae and there is no fat in it. Hairs and sudoriferous glands are absent, but sebaceous glands are present in large numbers. Their secertion here and over the areola serves to

keep the skin soft and to protect it from the saliva of the nursing infant."[8]

In addition to the exceptions noted above, we desire to record our observations on the sebaceous glands of the human nipple. These glands have been noted by some authors and apparently overlooked by others. Their importance from a purely histologic as well as from a practical standpoint seems to justify a record of the findings in a large series of nipples.

Nipples were collected from forty male and female bodies varying in age from twelve to sixty-five years. In all of the specimens, regardless of sex or age, sebaceous glands were found.

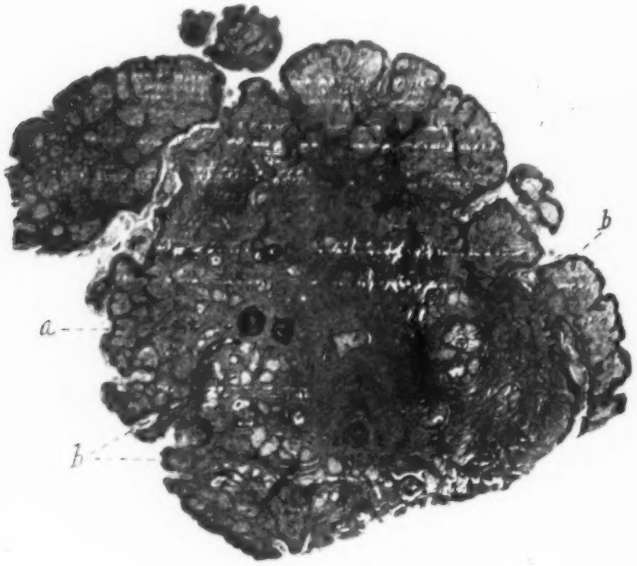

Fig. 1.—Cross section of the tip of a nipple of an adult female in which the mammary gland was in a resting condition. (*a*) Milk ducts; (*b*) sebaceous glands.

For the most part these glands are compound, having from six to nine saccules; occasionally a gland is formed by a single saccule. Each gland opens directly onto the surface of the nipple through a short duct. In no instance was one found to empty into a hair follicle or into a lacteal duct. Structurally the glands differ in no way from the sebaceous glands found in the other parts of the body. They are embedded in the dense areolar tissue and smooth muscle which makes up the stroma of the nipple (Fig. 1). The saccules are composed of polyhedral epithelial cells, the outermost of which are cuboidal but in some instances flattened. The cytoplasm of the outermost cells stains with the common cytoplasmic dyes and the nuclei are quite

basophilic, while the cytoplasm of the central cells, which are larger, take very little if any of the dye and the nuclei are pale (Fig. 2). We may infer that the outer cells represent the daughter cells of recent mitotic division, in which the process of fatty degeneration has not taken place. The outer layer of cells of each saccule rests upon a basement membrane.

Each saccule is surrounded by collagenous tissue which is destitute of smooth muscle fibers. This collagenous layer contains many blood ves-

Fig. 2.—Section of a sebaceous gland in the nipple of an adult female with a resting mammary gland.

sels and the capillary network is closely applied to the basement membrane. In the connective tissue surrounding the entire gland there are long slender bundles of smooth muscle fibers. These bundles are more compact than in other parts of the stroma in the tip of the nipple, having much the same appearance as the arrector pili muscle. It is reasonable to assume that the smooth muscle plays a part in the expulsion of the glandular contents.

The glands are found only at the tip of the nipple and the ducts for the most part empty upon the surface of the tip, although a few may open on the sides of the nipple but in no instance more than 1½

mm. from the tip. From this level to the areola, no glands were found in any specimen.

The ducts of the sebaceous glands are lined by stratified squamous epithelium which diminishes in the number of layers, but the cells increase in thickness as they approach the gland until finally we have a double layer of cuboidal cells and finally a single layer of flattened cuboidal cells.

During the period of lactation there is an apparent growth or budding from the primary saccules so that the entire gland is enlarged to

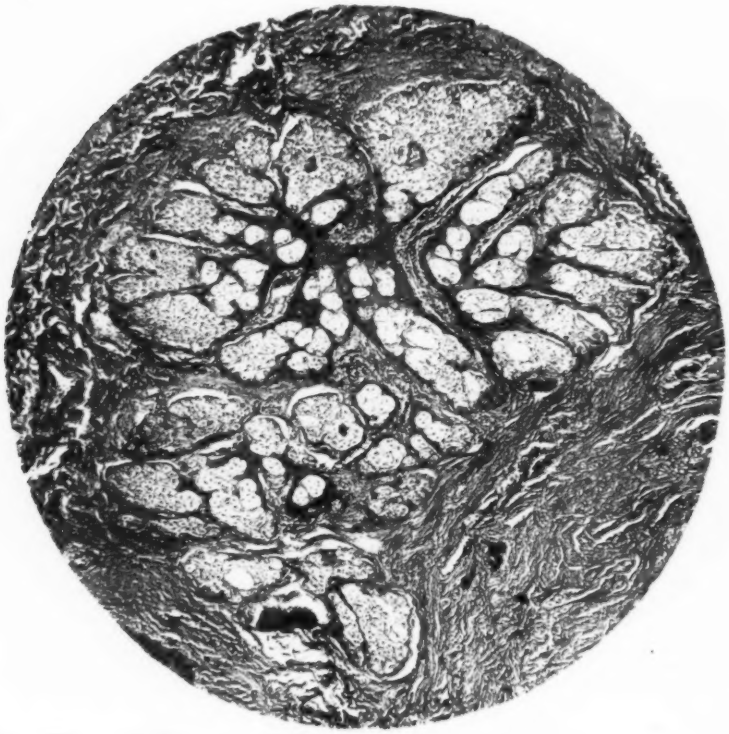

Fig. 3.—Section of a sebaceous gland in the nipple of an adult in the latter part of gestation.

many times its original size (Fig. 3). In one gland thirty-eight saccules were found; many of these, however, were very small and cross-section of the saccule showed from six to twelve cells.

The milk ducts are filled for a considerable distance with plugs which are made up of desquamated epithelial cells (Fig. 4). These cells probably represent the desiccated, flattened, cornified cells of the stratum corneum, as the stratum corneum extends for a short distance inward along the ducts.

The "elastico-muscular" apparatus as described by Liperovsky[9] although present in all specimens varies in different specimens as to the amount of elastic tissue and smooth muscle.

Finally, it is not unreasonable to ascribe to these structures that are found in the nipple certain features of practical importance. The plugs which are formed in the milk ducts may serve to prevent bacterial invasion of the deeper portions of the ducts and of the glands where, in the resting stage, there is only a single layer of cuboidal

Fig. 1.—Cross section of a milk duct in the nipple of an adult female with a resting mammary gland.

cells. The sebaceous glands of the nipple which are not associated with hair follicles, may be assumed to represent a mechanism for lubricating the surface of the nipple, as suggested by Piersol and Jackson. During lactation, this lubricating material would probably tend to prevent the drying action of the infant's saliva and of the milk during evaporation, and thus would in the end prevent desiccation of the deeper layers of the corium with resultant cracking of the skin.

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OUTLET PELVIMETRY AND ITS IMPORTANCE

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AFTER what perhaps might be termed a rather limited though diligent obstetric practice, I desire to present some of the impressions I have had regarding the pelvic outlet, based on practical experience and the opinions of modern authorities. I have long wondered why, in our average modern textbook, to a greater degree in our obstetric teaching, and by far a still greater degree in practice, so little stress is placed upon the pelvic outlet compared with the pelvic inlet. The experience of all who have done only a moderate amount of obstetrics and the experience of those who have done enough to compile long lists of reliable statistics, has shown that difficulties arising at the outlet are not only ofttimes equally severe to both mother and baby, but are also many, many times more frequent, and the resulting pathology and permanent injury perhaps ten to one as common as at the inlet. Again, all common measurements of the inlet except the internal conjugate are external, indirect, and inaccurate and of no value except in classifying the type of pelvis, while those of the outlet are direct, easily accessible and accurate as far as exactness is possible. Then, too, the baby's head, which after all is the only real pelvimeter, can be readily applied either manually or by test of labor to the inlet, and the proportions adjudged, but certainly not to the outlet until late in labor, which, indeed, is too late if the outlet proves small.

The normal female pelvic outlet may be considered a true rhomboid, whose transverse and anteroposterior diameters are 11 and 11.5 cm. respectively. For practical purposes it is composed of two triangles, an anterior or urogenital and a posterior or rectal. These triangles have a common base, the bisischial or transverse line joining the ischial tuberosities. The apex of the anterior is formed by the lower

edge of the symphysis while that of the posterior is formed by an equally rigid, fixed point, the tip of the sacrum. The boundaries of the two triangles differ chiefly in that the legs of the anterior are composed of rigid nonyielding bony barriers, the descending and ascending rami of the pubis and ischia, while the legs of the posterior are composed of the soft, yielding parts, mainly the levator ani, coccygeus, the superior and inferior pelvic fasciae, and less immediately the great and small sacrosciatic ligaments.

The diameters of the outlet commonly taken are the transverse, the anteroposterior, the anterior sagittal, and posterior sagittal. It is also customary to note the angle of the pubic rami as narrow, broad, or normal by outlining the rami with the fingers or thumbs. As to the diameters, my experience has demonstrated to my satisfaction

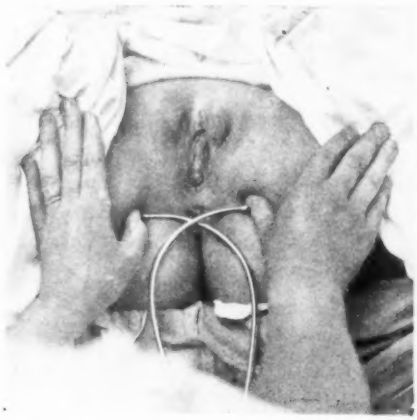

Fig. 1.—Measuring transverse diameter with an inlet pelvimeter.

Fig. 2.—Measuring transverse diameter with Williams' outlet pelvimeter.

that there are but two practical diameters, the transverse or bisischial and the posterior sagittal, first described by Rudolph Klien, in 1895, as that diameter extending posteriorly from the middle of the transverse or bisischial to the tip of the sacrum.

The technic of taking these diameters is as follows: The patient is placed in the exaggerated lithotomy position with the hips well over the edge of the table. This position greatly facilitates measurement because it forces the ischial tuberosities into prominence, and is little short of imperative in order to obtain accurately the posterior sagittal. The patient having been placed in this position, the ischial tuberosities are carefully palpated with the thumbs at the widest transverse diameter. This line will be found to pass transversely across the anterior border of the anus. I wish particularly to emphasize this point, because I find that the average student or the one unfamiliar with pelvimetry almost invariably locates this diameter one or two centimeters anterior to the anus, and thereby gets a reading erroneously short because of the converging rami. Having located the diameter, the thumbs are then so arranged that the planes of the thumb nails correspond to the planes of the inner surface of

the ischial bones. An assistant then measures the distance between the thumb nails with an appropriate pelvimeter (Fig. 1), or the examiner can conveniently perform the measurement alone by employing a special outlet pelvimeter, such as designed by Williams (Fig. 2), or DeLee. He may still more simply perform this maneuver by using an ordinary linen or steel tape stretched against the tuberosities over the thumb ends (Fig. 3). And what is still a more ready, though inaccurate, yet practical method in noting lateral contraction is passing the fist transversely between the ischial tuberosities (Fig. 4). The average fist is 8 cm. wide and if it can be comfortably passed the average head will come through.

The measuring of the posterior sagittal is much less simple, largely because its extremities are decidedly less accessible. The anterior extremity is centrally located on the fixed transverse interischial diameter, while the posterior is represented by the tip of the sacrum. The latter is rather difficult to demonstrate unless the patient's hips are well over the end of the table and the thighs well flexed. With the index finger in the vagina, the thumb is placed over the region of the coccyx. By moving the coccyx back and forth, the sacrococcygeal joint is determined and indicated by marking on the skin with a blue pencil.

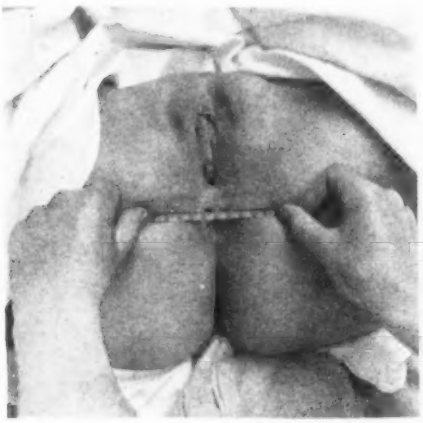

Fig. 3.—Measuring transverse diameter with tape.

Fig. 4.—Estimating transverse diameter by passing fist between ischia.

The original instrument devised for measuring this diameter was first described by Klien.[1] The common objection to it and to some of the modifications that followed was that it required an assistant. Thoms' modification is supposed to avoid this objection, and although I am quite familiar with it, and use it altogether, I must admit that an assistant is an added advantage and I believe that so far as the instruments that have been devised up to date are concerned, an assistant is always quite necessary in taking the measurement accurately. An instrument which bids fair to be a one man instrument (Fig. 5) devised by George H. Pierce,[1a] of New York, has recently come into my possession. The device of Thoms as well as the original of Klien, is so constructed that it may also be used to measure the transverse by placing the thumbs in the hooks and pressing them against the inner surface of the ischial tuberosities. The reading on the crossbar is noted, and then the thumbs are removed and the transverse bar is held in place with the fingers of one hand, while the free compass point is applied to the tip of the sacrum indicated by the pencil mark (Fig. 6). The extent of the measurement is indicated by a scale graduated on a special arm of the fixed leg of the compass. Owing to the thickness of the

sacrum, the reading is over correct by 1 cm., which should be subtracted. The normal net is 7.5 cm.

Some consider the posterior sagittal as measured from the middle of the transverse to the tip of the coccyx, but as pointed out by J. C. Hirst, II,[2] this is incorrect because the coccyx rarely obstructs labor, and in addition its tip does not lie in the true plane of the pelvic outlet. To obtain the anterior sagittal, the instrument is rotated 180 degrees and the distance similarly measured from the transverse to the lower margin of the symphysis (Fig. 7). This normally is 6 cm.

If one is not equipped with a special pelvimeter he may satisfactorily take this diameter in average cases by placing a tongue depresser or probe along the transverse and measure with an inlet pelvimeter from the middle of the straight edge to the tip of the sacrum (Fig. 8), substracting 1 cm.; or he may measure from the middle of the straight edge to the tip of the coccyx with either the inlet pelvimeter or ordinary tape (Fig. 9) adding 2.5 cm. to allow for the backward deflexion of the coccyx.

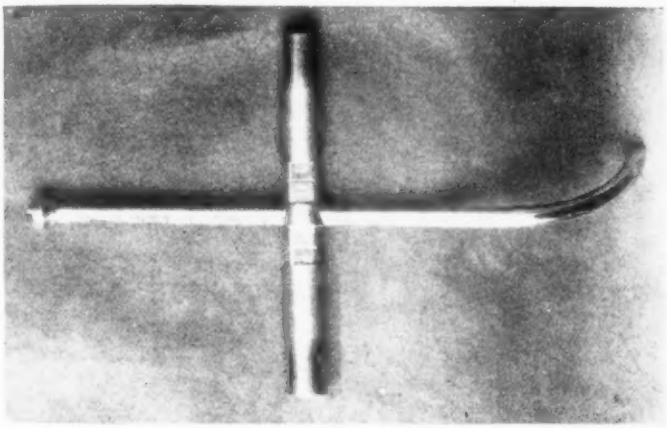

Fig. 5.—Outlet pelvimeter designed by George H. Pierce.

The simple direct manual method described by Edgar has not been found practical, especially where contraction exists. It is performed as follows: Make horizontal pencil marks over the ischial tuberosities indicating the extremities of the interischial diameter. The whole right fist is pressed into the rectal triangle, the ulnar border being carefully adjusted to the sacrococcygeal joint. The upper surface of the index finger or the semiflexed thumb is made by extension or flexion to come in contact with the center of the interischial diameter represented by a straight edge, such as a uterine applicator or heavy probe, joining the horizontal marks over the ischial tuberosities. The fist is then withdrawn and measured with a pelvimeter and the posterior sagittal diameter ascertained. In this instance 1 cm. is not subtracted.

Again, the geometric method of calculating the diameter in question, first suggested by Biddle, may be accepted as satisfactory. Take the square root of the difference between the square of the ischiosacral and the square of one-half the interischial. The result will be the posterior sagittal. Calculation may be avoided by constructing a table, giving both the ischiosacral and the posterior sagittal diameter for each centimeter of shortening of the transverse.

There seems to be a sufficiently constant relation between the distance between the superior posterior iliac spines, ordinarily known as the transverse diameter of the

rhomboid of Michaelis, and the transverse of the outlet to give this relation some practical value. I have found these diameters equal within 0.5 cm. in over 95 per cent of cases measured, ranging from 6 to 11 cm. In other words, a narrow rhomboid of Michaelis is very indicative of a narrow outlet, and a routine prenatal examination should include inspection of this rhomboid. Because in addition, the length of this rhomboid seems to have a definite relation to the conjugata vera—a short rhomboid foretelling a contracted inlet.

Fig. 6.—Measuring posterior sagittal diameter with Thom's instrument.

Fig. 7.—Measuring anterior sagittal diameter with Thom's instrument.

Fig. 8.—Measuring posterior sagittal diameter with straight edge and inlet pelvimeter.

Fig. 9.—Measuring posterior sagittal diameter with straight edge and tape.

It would be unjust not to mention the diligent effort made during the last five or six years both abroad and at home in the field of roentgenology[3] as regards pelvimetry, and strangely enough in many instances emphasizing the outlet. The articles are largely technical and appeal chiefly to the x-ray technician. The limitations of this paper do not allow of further discussion except that roentgenographic measurements in women far advanced in pregnancy are unreliable,

and if abnormalities are suspected, especially at the outlet, the examinations should be made early in gestation. Then, too, quite recently a series of cases has been reported by two very reputable authorities,[3a] questioning the safety of roentgenography during gestation, especially during the early weeks, because of the deleterious effect upon the fetus.

Outlet pelvimetry allows us to recognize the most common pelvic deformity in the American white woman, namely, the contracted outlet pelvis, commonly known as the funnel pelvis. Of all pelvic deformities in the white woman, it constitutes 44 per cent.[4] This is in marked contrast to 15 per cent in colored women. Its frequency, according to Williams,[5] Thoms,[6] and Williamson[7] is from 5.3 per cent to 7.7 per cent. Without pelvimetry this deformity is usually not found until late in labor, and is the most common cause of outlet difficulties.

This deformity, where outlet pelvimetry is not employed as a routine, is especially liable to be noted in that form of funnel pelvis known as the muscular type, which has been given considerable consideration in recent obstetric literature.[8, 9] The characteristic, abnormally large inlet measurements together with the muscular make-up of the patient, is quite likely to throw the novice off his guard. He may also overlook the accentuated lumbosacral angle bearing the high promontory which prevents head engagement, and he is liable to be further misled by not taking into account the fact that these patients characteristically give birth to stocky, bony-headed babies. Early recognition in these cases often thwarts disaster to both baby and mother by calling for early cesarean section.

In contracted outlet the transverse diameter is 8 cm. or less, the arch thus being of the male rather than the female type. In this particular an 8 cm. or less transverse is to an outlet, what an 8 cm. or less conjugata vera is to an inlet, in that both afford warning of probable difficulty.

The prime significance of the narrowed outlet is in the fact that in the normal female pelvis the pubic angle varies from 70 to 100 degrees and usually is a right angle, the occiput rotating under the arch emerges immediately beneath the pubis, the stress of the delivery is borne by the urogenital triangle, while in the narrowed outlet, the occiput is made to escape away from the arch and the head is forced on the perineum and against the coccyx and sacrum, the posterior triangle thus becoming the available outlet. Consequently various degrees of lacerations of the perineum, levator ani, pelvic fascia, and rectum result, with perhaps fracture of the coccyx, and should the sacral tip be far forward, delivery becomes impossible.

In deciding whether the head will or will not pass the outlet, it is

important to know the transverse and posterior sagittal diameters. In general, if the transverse is over 8 cm. no further measurement of the outlet need be taken. However, if it is 8 cm. or less, it is important to measure the posterior sagittal as above described. If the physician is not equipped or does not feel competent, he should, for his patient's sake and his own peace of mind, obtain the help of one sufficiently qualified to make the measurements. This is especially true in cases having a history of previous outlet difficulties.

It often happens that, although the transverse diameter is contracted, the posterior sagittal may be normal, or, indeed, may be of a compensatory extent, thus allowing the passage of a normally sized baby. The compensatory relation of these two diameters as compiled by Williams[10] is as follows:

Transverse diameter	8 cm.	Post. sagittal	7.5 cm.
" "	7 cm.	" "	8 cm.
" "	6.5 cm.	" "	8.5 cm.
" "	6.0 cm.	" "	9.0 cm.
" "	5.5 cm.	" "	10.0 cm.

A similar analysis of the importance of the relation of these two diameters in contracted cases has been emphasized by J. C. Hirst[11] through the formula known as the "Index of the Outlet" devised by C. D. Daniels, of Philadelphia. This index is derived by taking one-half the product of the transverse multiplied by the posterior sagittal; i.e., one-half the base by the altitude. Hirst gives this normally as $\frac{11 \times 10}{2}$ or 55 square cm. This 55 square cm. is called the normal "Index of the Outlet." If this index is 55 to 35, spontaneous delivery is the rule; if 35 to 25 considerable difficulty will be experienced; and under 25, delivery from below is very liable to be insurmountable.

These variations may be graphically given thus:

$$\frac{11 \times 10}{2} \qquad \frac{7 \times 10}{2} \qquad \frac{10 \times 7}{2} \qquad \frac{6 \times 9}{2} \qquad \frac{6 \times 7}{2}$$

Normal index of the outlet,		55,—spontaneous.
Index down to		35,—possible outlet forceps.
Index from	35 to	25,—usually forceps.
Index	25 or below,	—practically obstructive.

This formula assumes the normal posterior sagittal to be 10 cm., the same as originally described by Klien, which, to be exact was 9.95 cm. Practically all American clinics find it to be 7.5 cm. It is difficult to reconcile this discrepancy but possibly the German women of Klien's clinic normally have approximately 10 cm. posterior sagittals, for he found a lateral contraction of 24 per cent, which is four times that found among American women.

Of course this index, as well as the table of Williams in general applies to the baby weighing at least 7 pounds and not necessarily to smaller babies. J. C. Hirst, II,[12] reports two cases in which the babies weighed over 6 pounds, the one case having an index of 23.5 and the other 22. Each child survived; in the latter case, however, the baby showed signs of cerebral pressure for a time.

I have found this "Index of the Outlet" very applicable for teaching purposes in that it readily clarifies the subject for the average student.

Neither of these two mathematical guides should be accepted too dogmatically in all cases, because the occasional exception does occur. The ability of a child's head to mold, the position, the *vis a tergo*, and the patient's age are potent factors.

However, I do not believe that a pallid, gasping baby, finally resuscitated, beginning existence with minute hemorrhages permeating its brain, and a mother with a mutilated perineum left to bear the sequelae of disease and discomfort therefrom, constitutes good obstetrics.

It is not within the realm of this paper to discuss the effect of the contracted outlet upon presentation, mechanism, and conduct of labor. Yet it is difficult not to correlate a few practical facts arising from outlet pelvimetry; e.g., if pelvimetry shows a contracted outlet and the baby is of average size, an episiotomy is indicated, when delivery is to be conducted from below. Not only is an episiotomy indicated, but the type suggested; namely, the mesiolateral instead of the median. The median would lead to a possible extension of the tear into the rectum, especially if the size of the baby or the amount of contraction is underestimated. The mesiolateral episiotomy would permit of further extension, if necessary, into the less important tissue of the ischiorectal fossa, and if still further extension of the incision is indicated, it may be continued posteriorly as a concentric incision from 1.25 to 1.5 inches about the anus toward the midline, thus permitting the baby to be delivered *beside* the rectum rather than *through* it. This modification of the mesiolateral episiotomy was first advocated by Schuckart.

Again, the obstetrician, if cognizant of a contracted outlet, is most likely to be prepared to assist with forceps, if indicated, and knowing the situation, is apt to interfere earlier and not permit an unnecessarily protracted labor. His interest in the oversize and presentation and position of the baby will also be stimulated. This early interference may take the form of a pubiotomy or cesarean, depending upon the situation and individual operator. F. S. Newell[13] in a recent communication reports having seen 3 or 4 cases of ruptured symphysis from the leverage of forceps in endeavoring to work a head

through a contracted outlet. He states further that if the outlet had been carefully measured and the condition appreciated the deplorable accident could have been avoided by selective cesarean.

The accoucher will put a very unfavorable prognosis on a breech presentation and will avoid, if possible, a breech extraction because of the inability to deliver with sufficient rapidity the after-coming head, which not seldom requires forceps. DeLee[14] states clearly that a large number of these babies are lost, if not through forceps, by craniotomy.

For the same reasons the accoucheur, once awakened to a narrowed outlet, most likely will forsake that most commonly used of all emergency operations, the internal podalic version. Large shoulders and extended arms will afford him additional anxiety in both these groups of cases.

Narrow outlet pelvimetry will make the physician skeptical of a posterior position, especially if the head is high when labor begins, even though the transverse is up to 8 cm. He will also realize his handicap in attempting a Scanzoni on these cases. He will assume an unfavorable attitude even in the anterior positions if the head is above the spines when labor begins and the transverse is less than 8 cm. Thus the pelvimetry makes him place a special value on the different positions of the head. Also, if aware of lateral contraction, the conduct of labors complicated by eclampsia, placenta previa, prematurely separated placenta, and other emergency complications, will be governed differently than in normal outlet pelves.

From the foregoing, it may be conservatively concluded that pelvimetry of the outlet has a most distinct importance in successful obstetrics. I agree with Ehrenfest[15] that too much attention is given to the measurement of the true conjugate and mensuration of the pelvic outlet neglected. As a matter of fact I firmly believe there is more practical obstetrics at the outlet than at the inlet. It certainly is the most important pelvimetry for the general practitioner. As pointed out by Jellinghaus[16]—"It is so easy—requires no fuss or pain to the patient. Even if a man were too lazy to measure the posterior sagittal—he could benefit a whole lot by just measuring the transverse."

Because the bulk of obstetrics today is performed by the general practitioner, and the majority of our medical school graduates become general practitioners, and because contracted pelvic outlets with their sequelae are so prevalent, I am of the emphatic opinion that the progress of obstetrics cannot be advanced any more rapidly today than by greatly emphasizing this important subject of outlet pelvimetry in our textbooks and in all our practical obstetric teaching.

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504 Medical Arts Bldg.

THE RADIOTHERAPEUTIC MENOPAUSE: ITS SIGNIFICANCE AND MANAGEMENT*

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INTRODUCTION

THE great frequency with which it becomes necessary to bring about an artificial menopause, either by castration or radiotherapy, demands that the causes of the manifestations commonly associated with this state be accurately determined so that its management may be put on a rational basis. This knowledge can be obtained only by observing the patient for at least eighteen months, assuming that the menopause is established when amenorrhea has persisted that long, and determining what symptoms and conditions have really occurred, coincident with the onset of the amenorrhea. The opportunity to make this study has come through the follow-up system at the Presbyterian Hospital which brings back 80 per cent of the patients for personal examination and yields information concerning the general earning capacity and subjective sensations of the patients in over 95 per cent of the cases.

The complete study covers both the castrated women and those treated by radiotherapy. The present discussion is limited to the consideration of the latter: it is a purely clinical study and avoids as far as possible the fascinating speculation as to the mechanism by which the effects are brought about.

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METHOD

The material for the study is taken from the records of 206 patients who have had a radiotherapeutic menopause. The conditions selected for study comprise those which at the present time are commonly associated with the spontaneous "*change of life*" by both layman and physician. The word menopause, strictly speaking, means cessation of menstruation. By tradition and common experience it has come to imply much more; to include a group of diseases, symptoms, and conditions which is constantly diminishing as the real causes are discovered and the need of attributing them to the "change of life" eliminated. This group has, in the past, included practically every abnormal sensation and disease; serious diseases such as cancer, Bright's disease, diabetes, osteomalacea and tetany; all sorts of cutaneous manifestations, and nearly all the symptoms referable to the various body systems, notably nervous diseases and insanity; obesity, changes in sex characteristics, premature old age, and latterly many vague disturbances of general health and vitality thought due to disturbances in the endocrine balance.

Our selection has shortened the list to the following subjects, because they are commonly met with in the literature of the normal menopause or are in the minds of most women, particularly when facing the prospect of an artificial menopause: earning capacity, changes in weight, in age appearance and in sex appearance, libido, changes of blood pressure, in the joints, and in the nervous condition of the patient; hot flashes, and other unaccustomed sensations. Of late we have made some observations on the basal metabolism, hoping to throw some light on the question of obesity.

The cases have been divided into three groups, those under the age of twenty-five, to study alteration in physical characteristics in the young; those between twenty-five and thirty-eight years of age, to include the active childbearing period; and those of thirty-eight or over, because this age is commonly regarded as being the normal limit of the spontaneous menopause.

The patients were made either permanently amenorrheic by radium or x-ray or were so at the time that the observations were made. This group is small since our policy for several years has been to either give a full sterilizing dose or to avoid the use of radium or x-ray entirely.

GENERAL CONDITION

Explaining the tables concerning the subjects studied we find that the general condition and earning capacity has improved in practically every case because the patients have been relieved of ailments more or less incapacitating. The only exceptions to this general improvement have been six women whose nervous condition has prevented them from

utilizing the physical strength which they possessed. Even sufferers from tuberculosis, being relieved from loss of blood, have increased their activities. The weight has, for the most part, increased a few pounds, an average of six pounds in the cases observed. A few lost weight when their normal exercise was resumed. In only a few instances has there been a great increase in weight. Whatever may be said of the spontaneous menopause, it has not been our experience that obesity has been a prominent symptom arising after the artificial menopause.

The age appearance, as indicated by graying of the hair, wrinkling of and changes in the color and texture of the skin, is obviously difficult to appraise. In only two women of the series have these changes been abrupt enough to be considered as the result of loss of menstruation. This manifestation was particularly studied in the younger women. In them the only difference noted was in the color and texture of the skin which seemed more sallow.

The sex appearance was appraised by noting changes in hair distribution, voice, attitude toward the opposite sex, libido, the breasts, atrophy of the external genitals and vagina, and the size of the uterus. The only change noticed was that almost invariably the uterus, including the cervix, was very definitely and in many cases greatly reduced in size. Libido likewise seemed to be unchanged although the accuracy of the information on this point may be questioned.

Since the publication of Cecil's article on *Climacteric Arthritis*, we have endeavored to note the occurrence of this condition in our women. The information is as yet fragmentary. I feel at liberty to say that the number of women who developed joint symptoms within two years of the induction of the artificial menopause in the series of cases here studied is so small that this difficulty had not attracted my attention as one resulting from the procedure. We hope later to present a more detailed report.

During the past year, we have studied the basal metabolism of 11 patients before and after the artificial menopause. Of these, none has shown a change in the metabolic rate within a year. One as low as 17 per cent minus and another 22 per cent plus have remained unchanged. The greatest change was from plus 6 per cent to minus 6 per cent, both considered normal rates.

Hot flashes have occurred with such frequency that we regard them as a normal manifestation and the one definite indication of the presence of the menopause. The occurrence and severity as indicated in Table I are about the same as one would expect in the spontaneous menopause. It is difficult to determine the nature of the hot flash and the sweats that so frequently go with it. The conventional hypothesis that it is due to irritability of the sympathetic nervous system controlling the terminal blood vessels and sweat glands is satisfactory for the present.

TABLE I

THE SYMPTOMS OF THE ARTIFICIAL MENOPAUSE

	UNDER 25	25-38	38-	TOTAL
Hot flashes				
Absent	3	6	14	23
Mild	6	17	106	129
Severe	1	2	14	17
	10	25	134	169
Nervousness				
Unchanged	4	5	24	33
Improved	4	13	43	60
Mod. severe	1	5	42	48
Severe	1	1	5	7
	10	24	114	148
Age appearance				
Unchanged	5	0	50	55
Older	3	3	14	20
Younger	3	2	2	7
	11	5	66	82
Secondary sex characteristics				
Changed	0	0	2	2
Unchanged	6	32	29	67
	6	32	31	69
Libido				
Unchanged	3	8	25	36
Decreased	1	0	1	2
Diminished	0	0	2	2
	4	8	28	40
Blood pressure				
Unchanged	5	14	63	82
Increased	0	0	16	16
	5	14	79	98

A study of the blood pressure shows that in 16 patients or 19.6 per cent of all the cases observed, there was an increase of over 20 mm. of mercury within eighteen months after treatment. It is interesting to note that all of these rises occurred in women thirty-eight years of age or over. The mechanism by which the increase is produced is difficult to determine. Without having made a careful blood chemistry study in all of the cases, it has appeared that the rise in blood pressure has paralleled the general behavior of the women experiencing it or has been a symptom of kidney disease.

For example, a woman of forty-five was treated because of persistent uterine bleeding which was of a character that suggested the possibility of carcinoma. She returned four months after the operation in a state of considerable agitation with the carcinoma question still unsettled in her mind. Her blood pressure measured 190/90. She was readily relieved of the worry about the carcinoma and because of the high blood pressure was referred for investigation of her kidneys. About three hours after the first blood pressure measurement, after lunching and strolling through the park, she had a blood pressure of 122/85. The elevation in this case was obviously due to her nervous tension. Another case occurred in a woman suffering from a severe anxiety neurosis, who continually haunted the offices of the three physicians who were interested in her, endeavoring to get them to admit that her friends were in a conspiracy to defame her character. This condition of mind had existed for a

period of several years before the operation, and blood pressure taken at that time was sometimes high and sometimes low. Following the operation, the nervousness increased for nine or ten months and with the increase of the mental excitement her blood pressure steadily climbed from 130, postoperative, to 170. As she became calm and more normal in the course of another eight or nine months, the blood pressure dropped and has remained in the neighborhood of 140. A third type of hypertension occurred in the wife of a college professor; their modest circumstances caused her to worry about how to make ends meet and to maintain her position in the college community. She had no particular neurosis but was under a continuous tension. Her blood pressure was 150/100 before operation and has continued high, being 200/140 one year after operation, and 180/115 two years after operation. During this time she had puffiness of hands and feet and turned out to be a definite case of chronic nephritis.

In summary, these observations would indicate that a moderate elevation in blood pressure may occur after the establishment of the artificial menopause in women of thirty-eight or over and that this rise is due more to renal disease or to the general mode of life and emotional state of the individual than it is to the loss of the ovarian substance. This conclusion is reinforced by the experience of Doctor Sharlit; namely, that in hypertension occurring in the spontaneous menopause the use of ovarian extract alone without changing the mode of life and mental attitude of the women has failed to lower the blood pressure more than a few millimeters, although at the same time it has caused a marked diminution in the hot flashes. On the other hand, experimentally, Hoskins and Wheelan[1] were able to show in castrated animals an increased blood pressure response to injections of nicotine.

NERVOUS SYMPTOMS

More important, perhaps, than any of the other symptoms are those referable to the nervous system, because they, of all the symptoms anticipated, are most feared by the patient and most difficult for the physician to understand and relieve.

In a group of 148 cases in whom nervous symptoms were recorded, there were seven cases of serious nervous disorder, all occurring prior to 1921. Of these, five were in women beyond thirty-eight years of age, one at the age of thirty-seven, and one at twenty-three. Forty-eight women were worse off nervously than they were before treatment, but were not disturbed enough to demand serious consideration or treatment, while 33 could appreciate no change in their nervous state, and 60 felt decidedly better.

Of the seven women suffering from severe nervous diseases, two had melancholia, four an anxiety neurosis, one of which was of a paranoid form, and one was an alcoholic. Of the two cases of melancholia, one was insane at the time she was treated although it was unrecognized by us, the duration of the nervous disorder being only determined after she was committed for her insanity. The second case of melancholia was very mild, should perhaps be called merely an exaggerated anxiety neurosis; and occurred in a spinster of forty-five who had never been out of a small

village and was a typical shut-in, protected, and at the same time regarded as a burden by her brothers and sisters. She showed great agitation while under treatment, had an attack of weeping and self-pity during the consultation and during the recovery from the anesthetic given for diagnostic curettage showed a most marked antagonistic anxiety, complaining that hysterectomy had been performed in spite of promises to the contrary. These anxieties increased in number, especially with the beginning of hot flashes. She voluntarily went to a sanitarium for three months. She was later cared for at home, gradually recovered and three years after the induction of the artificial menopause resumed a normal life. In connection with the nervous manifestations occurring in this woman, it is interesting to note that the family of the patient appreciated the mechanism by which the severe nervous state was brought about; the development of abnormal ideas suggested by ill-advised unfavorable predictions on the part of friends and of two physicians. The firmness of their conviction that the psychosis was not due to the artificial menopause and loss of ovarian function is indicated by the bringing of another sister with precisely the same condition (menorrhagia, fibromyoma of uterus) for precisely the same treatment eight years after the first sister had been treated. The woman with alcoholism was treated in the hope that the complete menopause might terminate her agitation. Up to two years after the operation, it had made no difference in her habits.

Of the cases suffering from an anxiety neurosis, one was a woman aged twenty-three, the only young woman so afflicted. She was a moron with the mental age of possibly ten years; she had had several operations to stop uterine bleeding and finally came for radiotherapy. She was amenorrheic for three years. During this time she had hot flashes and many other symptoms, all of which were attributed by her mother, who seemed to have more anxieties than the patient, to the absence of menstruation, including even an attack of duodenitis with jaundice. She begged incessantly to have bleeding restored. She was told that menstruation could not be brought back, but that we could cause bleeding from the vagina. This she asked to have done. Accordingly under local anesthetic a slit was made in the wall of the vagina and some small veins opened which bled with satisfactory profuseness for three or four hours and showed some blood for two days. The patient's complaints ceased for about five weeks and then returned with as great severity as ever. The cessation of symptoms demonstrated that the major part of the patient's distress was mental and that the physical part, for a period as long as five weeks was not sufficient to cause complaint on her part. It also demonstrated the fallaciousness of using a placebo in serious disorders. The other three cases of anxiety neurosis would be described as moderate, except that there was considerable interference with their normal life which required constant management over a period of two years in one case, and five years in another.

The group described as being moderately nervous felt mostly an emotional instability, irritability, and a sense of incompetence. They were anxious about the significance of their multitudinous sensations and attributed them all to the menopause. Some of the women in executive positions, including social workers and nurses in charge of hospital activities felt a loss of power to concentrate. It was difficult to tell whether the lack of concentration was due to any chemical change that may have occurred or whether it was due to the distraction caused by their fears and uncomfortable sensations. These were varied but for the most part were expressed as tingling in the fingers, numbness and an inability to hold small objects, itching in part or all over the body, or sensations of coldness in the hands and feet.

Most interesting is the observation that in 22 per cent of the cases, the nervous condition was unchanged and in 40 per cent was improved, making a total of 62 per cent who were unchanged or better. This is explained by the circumstances under which the artificial menopause was induced. These were sick women. They were worried about cancer; many were anemic and prostrated. The relief from their anxiety, the termination of their hemorrhages with consequent improvement in health and complete freedom to follow their normal pursuits overbalanced the discomfort of the hot flashes and any tendencies toward anxiety neuroses.

TABLE II

SHOWING IN A GENERAL WAY THAT THE SEVERITY OF THE NERVOUS SYMPTOMS RUNS PARALLEL TO THE SEVERITY OF THE HOT FLASHES

AGE	HOT FLASHES	NERVOUS SYMPTOMS				
		IMPROVED	UNCHANGED	MODERATE	SEVERE	TOTAL
16	Absent	1	1	1	0	3
to	Mild	3	3	0	0	6
25	Severe	0	0	0	1	1
25	Absent	1	1	1	0	3
to	Mild	12	1	0	0	13
38	Severe	0	0	4	1	5
38	Absent	5	3	1	0	9
and	Mild	38	29	26	0	93
over	Severe	0	2	7	5	14
Total		60	40	40	7	147

It is interesting to attempt to determine the mechanism which brings about these nervous manifestations when they do occur, for upon such a determination will our management of the problems depend. At the present time there are two schools, the endocrinologists who attribute the disorders to the absence of certain chemicals in the body, and on the other hand the psychiatrists who regard them as of the same nature as other similar nervous disorders regardless of sex, time of life, or state of the reproductive system. That the endocrine disturbance plays some part is assumed because of the frequent molimena accompanying menstruation, such as headache, vomiting, mental depression, and irritability. Also it is common knowledge that many changes in the emotional state, sense of well-being, and general health occur in pregnant women. There is, moreover, abundant experimental evidence of profound effects of castration in young animals, and clinical therapeutic evidence presented by the endocrinologists. Table II showing the relationship of nervous symptoms to hot flashes indicates that the severity of the two symptoms runs more or less parallel. If we take the hot flash as a standard of the menopause, this parallelism might further point toward an endocrine basis for the neurosis.

However, my failure up to 1921 to relieve these symptoms by the administration of ovarian substances, and the greater success resulting

from the application of the principles given below makes it advisable, from the practical standpoint, to discuss these rather than the endocrinologic factor. I will attempt to outline the causes of the neuroses on the basis of their being psychogenic in origin and will take the liberty of stating the principles didactically, my own conclusions from the observation of these cases coinciding remarkably with those of Norberry and Dollear,[2] Adler,[3] Smith,[4] and Casamajor[5] upon the neuroses of the spontaneous menopause.

The predisposing causes of an involutional (menopause) psychosis are heredity, preexisting diseases and intoxication, especially syphilis, and especially preexisting evidence of an abnormal nervous make-up (the neurotic constitution, Adler). Without exception, the seven cases of severe nervous disorder here presented had given evidence of a defective nervous constitution.

Next in importance is the development of abnormal mental habits. In women this is particularly easy in matters concerning sex. These are:

Feeling of inferiority of the female sex. (a) Their physical strength is obviously less than that of the male. (b) Emotionally, they are regarded by themselves and in the general literature as weak, gentle, frail, temperamental, vascillating. The very word hysteria implies womb trouble, although it occurred in many of the men who were shell-shocked in the late war. (c) Intellectually they are held in the same regard. Striking evidence of this is presented by the attitude of the community toward the admission of women to the polls. The newspaper and other comment on their activities in intellectual or executive fields implies that they are on trial, that of the males being condescending or amused, that of the females defensive and explanatory. (d) Economically women, outside of the home, have been with few exceptions, up to modern times, employed as menials or attendants except when their sex has been commercially employed; an occupation which in Japan, for instance, has become highly industrialized.

An exaggerated attitude toward the power to reproduce, and its indicator, menstruation. This function has been through the ages the one fundamental possession of womankind; and has determined the attitude of the community toward them. Where there is overpopulation, they destroy the female children as in China where special apparatus is provided for the purpose! There is the baby tower where the highly placed window is so arranged that a mother bringing her child is compelled to push the baby left by her predecessor into the gorge below in order to leave her own to be pushed off by the next mother. In the Pearl River, near Canton, I saw, in 1910, a raft provided for depositing the numerous drowned bodies (nearly all female) making it possible for the police boat to economically collect them in

batches. The practice of suttee in India is based on the same idea. Here a widow, who by custom is prevented from remarrying, burns herself up on the funeral pyre of the deceased. In more modern times and with a desire for more population we see the same attitude expressed in our laws concerning abortion and birth control. Nothing short of impending death or similar catastrophe will justify interference with the biologic process. Neither the personality of the woman nor her effectiveness in other fields is allowed to interfere with the one supreme function.

We are not here concerned with the question of whether the female sex is or is not inferior or with the justice of the treatment accorded them by society, but rather with the question of what is the present attitude of women and the community in general toward this function and how severe a shock the termination of the power to reproduce would be. My interpretations of the expressions of the women who furnish the basis of this study is that it is a very great shock and should be proposed with due regard for its effect on the mind of the woman.

The third mental habit which may lead to a psychosis is the fear of definite symptoms and conditions which are supposed to follow the menopause, especially when artificially induced. They fear (a) a general change in their whole make-up, the advance of old age, obesity, a change in sex characteristics with loss of sex attraction and libido. They also fear (b) diseases common at the time of the normal menopause such as cancer, Bright's disease, hypertension, heart disease, and insanity, and (c) those diseases which frequently become fully manifest after the advent of amenorrhea in a young woman, such as tuberculosis and profound anemia; erroneously believing that the amenorrhea brings about the disease.

THE EXCITING CAUSE

In a woman possessing in slight or great degree a feeling of inferiority, a distorted idea of the importance of the power to reproduce and fear of physical harm from the treatment, the power to reproduce is suddenly terminated. The skipping of the first period after radiotherapy is more or less dramatic, the woman using the words "marvelous," "magical" in speaking of it. The definite sensations, hot flashes, sweats, and paresthesiae constantly remind her that the reproductive function has ceased. She is also constantly reminded of her plight by interested female friends and by physicians who either through negligence or ignorance on the one hand, or because they hold a positive opinion that the loss of the ovarian secretion is the most important cause of the neurosis, cause her to take many medicines and return often to the physician's office for the treatment of her abnormal condition.

The reaction of the woman possessed of an abnormal nervous make-up to this sequence of events is either to become depressed even to a state of melancholia, which is the most common form of involutional psychosis, or to manifest a directly opposite behavior, becoming defensive, overactive and aggressive because of her unwillingness to submit to her fate. These are the old ladies who seek young men as intimates or aspire to a youthful appearance by exaggerated use of prevailing styles in dress, bright colors, cosmetics, hair bobbing, and so forth.

To summarize this conception of the effect of the radiotherapeutic menopause on the nervous system: there is evidence that the loss of endocrine balance is in part responsible for the neuroses. The major cause is believed to be similar to that of psychoses in general: heredity, intoxications, preexisting nervous abnormality, the "neurotic constitution," general sex inferiority attitude, exaggerated attitude toward the importance of the reproductive power, and anxiety over the consequences of the termination of menstruation; all of which tendencies are precipitated by the sudden termination of menstruation and the incidence of obvious discomforts.

The management of the discomforts of the artificial menopause will depend upon the amount of emphasis placed upon either of two opposed principles, one which holds that there is one fundamental chemical disorder underlying all the manifestations; the other which maintains that each of these has its own peculiar causes. In the management of the cases here presented the treatment was carried out from 1913 to 1921 according to the first principle. Patients who had been made amenorrheic by radiotherapy were given some form of ovarian extract when their complaints seemed to demand it. The unsatisfactoriness of the results was indicated by the patients' repeated application for relief. They continued to be distressed, even though possibly relieved of some of the sensory disturbances. Since 1921 the second principle has been followed, that of treating each of the manifestations according to our conception of its causes, irrespective of the element of sex.

It has been found possible to relieve the hot flashes to a satisfactory degree by the use of some ovarian substances but because the discomfort is mostly sensory and because its severity is influenced largely by the nervous condition of the patient, it has become the practice to avoid, as far as possible, the use of ovarian extract and to stress the management of the patient's general physical and mental health.

Hypertension, when occurring subsequent to the establishment of the artificial menopause, has occurred so seldom and has been so moderate that no general policy has been established. When the blood pressure measures over 150 systolic, the patients have been referred to the general medical clinic where they have been treated like other patients

suffering from hypertension, although there also some studies are being made of the effects of ovarian substances.

The paresthesiae have been managed more or less as have the hot flashes, but even less stress has been placed upon the use of ovarian substance.

The nervous manifestations have been managed almost entirely by psychotherapy. The use of ovarian extracts has been carefully avoided. One woman suffering from severe mental depression was refused an artificial menopause because we judged her to be unable to stand the strain of having her sex power disturbed. We have attempted to educate or reeducate women on whom an artificial menopause was to be performed before the act rather than after the nervous manifestations might appear. Taking the cue from the psychoanalysts, we have found that the warding off of anticipated nervous tendencies before they have had an opportunity to begin has been accomplished with a fraction of the effort required to correct them when once established. The patients have been able to assume a reasonable attitude toward the question of sex inferiority, they learn that the power to reproduce, important as it is to the race or the community, has no such importance to the individual. The sensations which are to be expected, particularly hot flashes, are described to them, and, as far as possible, their causes explained so that when they appear there will be no element of surprise, and, lastly, the patient is given a list of those sundry conditions which are likely to be presented to her by her friends as resulting from the menopause and the cause of each explained as far as possible on a rational basis.

CONCLUSIONS

1. The only constant symptom of the radiotherapeutic menopause is the so-called "hot flash."

2. Associated with the hot flash there occasionally occur sensory disturbances, predominant among which are numbness and tingling in the fingers and a sense of stiffness in the hands.

3. A few women over the age of forty appear to have increased blood pressure after the radiotherapeutic menopause; in each case explainable by kidney disease, mode of life, or emotional state. There were no cases in women under this age.

4. Changes in the age appearance, secondary sexual characteristics, and libido have not occurred.

5. Obesity has not occurred with any regularity. The basal metabolic rate has shown no change.

6. Psychic disturbances are rare. The cause seems to be similar to that of other psychoses and not directly attributable to the loss of ovarian secretion.

7. The management of symptoms and conditions following the radiotherapeutic menopause should be based upon general principles rather than upon the theory that they are caused by the loss of the ovarian secretion.

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(*For discussion see page 856.*)

AN ANALYSIS OF SEVENTY-NINE CASES OF PLACENTA PREVIA

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IT IS the purpose of this paper to present an analytic study of a series of cases of placenta previa as they occurred in a general hospital, where the obstetric work is done largely by general practitioners and a staff of three specialists; the latter being called as counsel in the greater percentage of the difficult cases. What I intend to give here is purely a summary of results which may be used and interpreted as the average in the occurrenc of this obstetric abnormality.

The study consists of the cases of placenta previa encountered at our hospital in the last five years. During this period there was a total of 7,928 women delivered, among whom there occurred 79 cases of placenta previa, or a very small fraction over 1 per cent of the total. This average of 1:100 agrees fairly well with the generally accepted statistics. Williams[1] gives the ratio for hospital practice as 1:250. Peterson[2] states that placenta previa occurs about once in every 300 cases in hospital practice. DeLee[3] gives it at 1:1500 to 1:300; Edgar[8] quotes an average of 1:250. Hitschmann,[7] quoting the various German clinics, gives the average occurrence as 1:250 to 1:1000. Our average is slightly higher than the others, inasmuch as the percentage of abnormal cases entering the hospital is very high.

As a point of interest, I tabulated the frequency of occurrence as to month and season and found that our cases occurred evenly distributed throughout the various months, there being no seasonal variation.

ETIOLOGY

In our series of 79 cases, there was a total of 306 labors, or an average of 4.033 labors per case. The average number of years of married life was 8.27. This gives an average occurrence of one labor in every two years. Fifteen of these cases were primiparae. This is slightly

above the average statistics. Magyrier at the Baudelocque clinic found 46.6 per cent among primiparae. These figures have not been generally agreed upon. Doranth, in Chrobak's clinic, gives the incidence of placenta previa as 0.17, 0.48, 1.37, 1.28, and 3.39 per cent according as the patients had given birth to 1, 2, 3, 4, 5, or 6 children respectively.

A distinct history of endometritis could not be obtained in many cases. The incidence of its occurrence may be estimated from the following histories obtained.

Previous instrumental labors	19 cases
Closely repeated pregnancies	15 cases
Previous puerperal infection	2 cases
Previous placenta previa	7 cases
Interference from abnormal presentations	4 cases
Eclampsia	2 cases

It will be noted that this list includes 43 cases, each having had one or more of the previous abnormalities, a total of 54.43 per cent. Co-

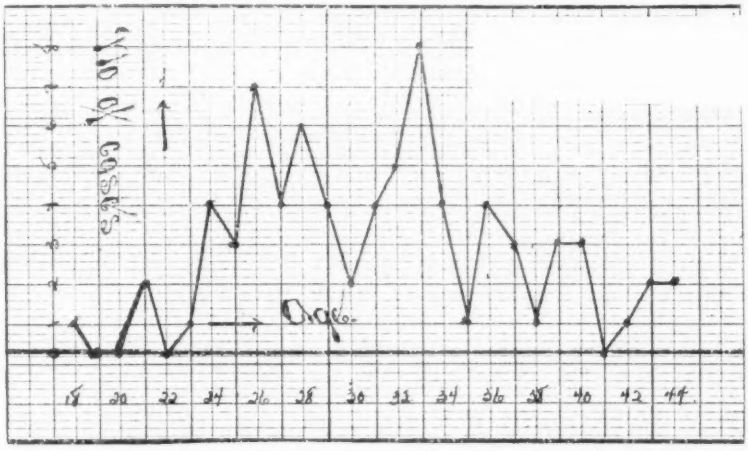

Chart I.

incident with these there was discovered on physical examination a relaxed perineum or a lacerated cervix or both in 45 cases—a total of 56.95 per cent.

AGE INCIDENCE

Strassmann[1] in his series found that the average age of his patients was 32.9 years, and that the average number of labors was 6.38. This is somewhat higher than in our series, in which the average age was 29.02 years and the average number of labors was 4.033. Chart I graphically represents the ratio of age to the number of cases. The lowest number occur at the period of early married life and near the

menopause. The greatest number occur between the ages of twenty-six and thirty-six. (Chart II.)

TYPES OF PLACENTA PREVIA

The frequency of occurrence of the three types and the maternal and fetal deaths associated are as shown in Table I.

TABLE I

TYPE	CASES	PERCENTAGE	MATERNAL DEATHS	FETAL DEATHS
Central	23	27.848	8	21
Marginal	35	44.303	2	18
Lateral	20	26.583	0	11
Unknown	1	1.266	1	1

Although the marginalis type predominated, the greatest fetal and maternal mortality occurred with the centralis type.

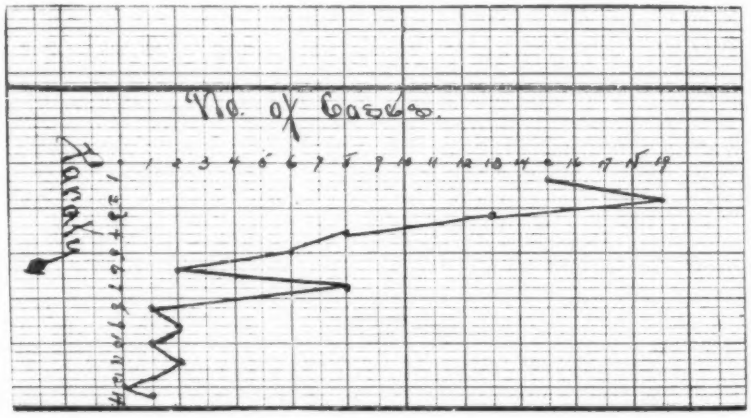

Chart II.

PRESENTATIONS

It is generally recognized that inasmuch as the placenta previa occupies the lower uterine segment, there is an interference with the accommodation of the fetal head with consequent abnormal presentations frequently resulting.

We found the presentations to occur as indicated in Table II.

TABLE II

TYPE	CASES	PERCENTAGE
L. O. A.	38	48.1
R. O. A.	25	31.64
R. O. P.	6	7.7
Unknown	1	1.26
S. L. A.	5	
L. M. P.	1	
R. S. P.	1	11.3
Left bregma	1	
Transverse shoulder	1	

There were 9 abnormal presentations or an average of 11.3 per cent. Müller[5] in his series of 1,148 cases gives the incidence of abnormal presentations as 33 per cent.

HEMORRHAGE

The outstanding and most characteristic symptom, and the symptom which often gives the first intimation of an impending placenta previa, is hemorrhage occurring usually in the last trimester. Among our series, 54 cases gave a history of hemorrhage after the sixth month, or a total of 68.35 per cent. All of the cases gave a history of hemorrhage just preceding entrance to the hospital. In 51 cases, 64.55 per cent, a bloody vaginal discharge was encountered at the first examination on hospital entrance. The degree of hemorrhage and the relationship to the various types of placenta previa is as follows:

Antepartum, profuse	68	cases	86.07%
slight	11	cases	13.92%
Total—100 per cent.			
Postpartum, profuse	9	cases	11.39%
slight	20	cases	25.31%
Total—36.70 per cent.			
CENTRALIS			
Antepartum, profuse	21	cases	26.58%
slight	2	cases	2.53%
Postpartum, profuse	6	cases	7.59%
slight	5	cases	6.33%
MARGINALIS			
Antepartum, profuse	29	cases	36.70%
slight	6	cases	7.6 %
Postpartum, profuse	3	cases	3.8 %
slight	10	cases	12.66%
LATERALIS			
Antepartum, profuse	16	cases	20.25%
slight	4	cases	5.06%
Postpartum, profuse	0	cases	0.0 %
slight	6	cases	7.6 %

It is noted at once that antepartum bleeding was profuse in all types of placenta previa. In one case the hemorrhage history is unknown. Antepartum hemorrhage occurred in 100 per cent of the cases, whereas postpartum hemorrhage occurred in 36.70 per cent. Profuse antepartum hemorrhage occurred in 66 cases, or 83.54 per cent. The relationship of hemorrhage to trauma of the cervix is well illustrated when it is understood that in over 60 per cent of the cases there were definite cervical tears.

FETAL INCIDENCE AS TO SEX AND SIZE

In our series there were 43 males and 36 females. Most of the babes born were premature as indicated by length measurements. (Chart III.)

PELVIC MEASUREMENTS

A study of the pelvic measurements showed that variations are not markedly beyond the normal so that no relationship can be attached to

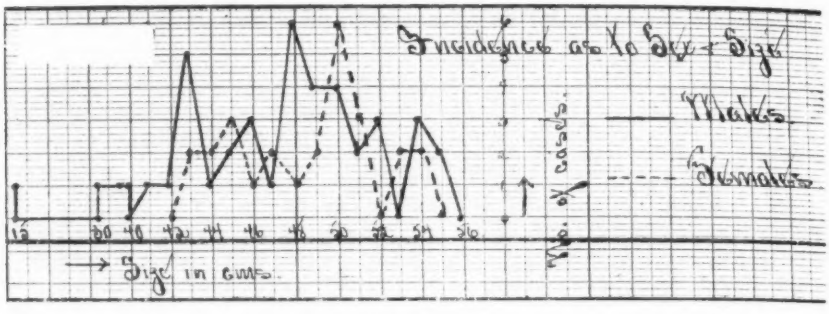

Chart III.

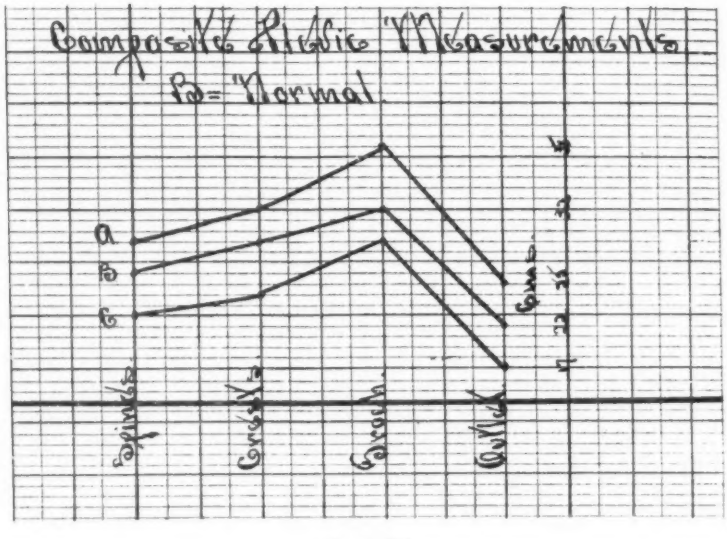

Chart IV.

the pelvic measurements influencing the occurrence of placenta previa. (Chart IV.)

FETAL MORTALITY

Total fetal deaths	51 cases
Absent heart tones before delivery	16 cases
Faint heart tones before delivery	14 cases
Stillbirths	30 cases
including prematures 19, hydrammios 1, and anencephalus 1.	

Cause of Death After Birth

Atelectasis	3 cases
Gastroenteritis	1 case
Anemia	1 case
Prematurity	11 cases
Asphyxia neonatorum	4 cases
Cerebral hemorrhage	1 case
Total	21 cases

The total fetal mortality was 64.55 per cent. Of the 51 deaths, there were 19 premature stillbirths and 11 prematures born alive,—30 cases

or a total of 58.82 per cent. Of the 51 deaths, 30 were stillbirths or 58.82 per cent. Of the 51 deaths, 16, or 31.37 per cent, had absent heart tones before delivery.

MATERNAL MORTALITY

In our series there were 11 maternal deaths, a total of 13.79 per cent. Depken[6] reports a maternal mortality of 9.4 per cent. Hitschmann[7] gives the maternal mortality rate of the various European clinics as:

Doederlein,—Bavaria	19.00%
Krönig,—Baden	18.2 %
Mende,—Waldburg	15.0 %
Lefebre,—Mecklenburg	9.3 %
Chaclaies,—France	15.5 %

Our mortality rate therefore compares favorably with that of the leading clinics of the world. Again it should be remembered that our cases are from a general hospital rather than an individual clinic. Attention is called to Case No. 3 in Table III, which was admitted the tenth day postpartum. No definite history could be obtained. The case was admitted in a moribund condition. Case No. 4 had labor induced by cervical pack followed by version and breech extraction. In this case there were five vaginal examinations made during the course of labor.

The striking point throughout all of these cases was the severity of the hemorrhage.

TABLE III

THE DEATH SUMMARIES

NO.	CAUSE	HOURS P. P.	HOURS IN LABOR	HEMORRHAGE	TYPE PLACENTA PREVIA	METHOD DELIVERED	PLACENTA DELIVERED
1	Exsanguination	2	13	Profuse	Centralis	Ver. br. extract.	Spontaneous
2	Exsanguination	½	8	Profuse	Centralis	Ver. br. extract.	Manual
3	Exsanguination	11 da.	?	Profuse	?	?	Spontaneous
4	Puerp. sepsis	72	47	Slight	Centralis	Ver. br. extract.	Spontaneous
5	Exsanguination	4	½	Profuse	Marginal	Ver. br. extract.	Spontaneous
6	Shock	0	45	Profuse	Centralis	Vag. cesarean.	Manual
7	Exsanguination	3	20	Profuse	Marginal	Normal	Manual—torn
8	Exsanguination	1	52	Profuse	Centralis	Ver. br. extract.	Spontaneous
9	Shock	2	9	Profuse	Centralis	Ver. br. extract.	Manual
10	Cerebral embol.	3	61	Profuse	Centralis	Ver. br. extract.	Credé
11	Shock	3	?	Profuse	Centralis	Ver. br. extract.	Credé

In nine out of the eleven cases death followed rapidly after the birth of the child. The degree of shock from the severity of the blood loss was tremendous. The cardiovascular system was so impaired that stimulants and restoratives were useless. The mortality rate was high because most cases were seen late and were very bad risks. In fact, many of the cases were rushed into the hospital in a moribund condition, too late for much to be done.

METHODS OF DELIVERY

Hitschmann[7] leads the conservative school of Europe and believes in bag induction followed by version and breech extraction. Depken[8] advocates cesarean section as the method of choice in the best interests of both mother and child. Table IV summarizes the various methods with the consequent maternal and fetal deaths in relation to the number of cases.

TABLE IV

METHOD	CASES	MATERNAL DEATHS	FETAL DEATHS
Version, breech extraction Cervical pack induction	23	4	15
Version, breech extraction Voorhees bag induction	8	3	6
Version, breech extraction Braxton-Hick's	5	0	4
Version, breech extraction Manual dilatation	3	0	1
Version, breech extraction	4	1	3
Potter, version Placenta ruptured	1	0	1
Version, breech extraction	1	0	1
Normal delivery Voorhees bag induction	13	1	9
Normal delivery Cervical pack induction	3	0	1
Normal delivery Bougie induction	2	0	1
Normal delivery Membranes ruptured manually	1	0	0
Normal delivery	2	0	0
Vaginal cesarean section	2	1	1
Classic cesarean section	3	0	2
High forceps Manual dilatation	1	0	1
High forceps	1	0	0
Mid forceps	1	0	1
Low forceps Manual dilatation	1	0	1
Low forceps	1	0	0
Breech extraction	2	0	2
Unknown	1	1	1
Total	79	11	51

In our series there were twenty-one various methods used, with version and breech extraction the most frequent, and spontaneous normal delivery coming second. However, the first group comprised the more difficult cases; and although the mortality was highest with this method, yet when the relative difficulty of the cases is considered, the method of version and breech extraction was perhaps the most applicable. The Voorhees bag induction followed by version and breech extraction, although used only in five cases, is perhaps the method of choice in the most difficult cases.

PUERPERAL SEPSIS

There were eight cases of puerperal sepsis in this series. It should be remembered that there was considerable manipulation and examina-

tion previous to hospital entrance, and that many of the cases were very poor risks to start with. In the entire total of seventy-nine cases, there were 138 vaginal examinations made, or an average of 1.75 per case. In this group of septic cases which numbered eight, there were 21 vaginal examinations made, or an average of 2.6 per case. Of this group of eight cases there was one death; and it should be noted that this particular patient had five vaginal examinations. Due to the degree of hemorrhage and the condition of exsanguination, these patients are particularly susceptible to infection, inasmuch as the resistance is so markedly lowered. Hitschmann[7] gives the mortality from puerperal sepsis as 1.9 per cent for hospital practice, and 4.3 for general practice.

Table V lists the cases developing postpartum puerperal sepsis.

TABLE V

DIAGNOSIS	NO. OF VAG. EXAM.	METHOD OF DELIVERY
1. Puerperal sepsis	1	Norm. del.; vag. pack for postpartum hemorrhage.
2. Puerperal sepsis	0	Norm. del.; manual del. of placenta. Vag. pack for postpartum hemorrhage.
3. Puerperal sepsis	5	Cervical pack induction; ver. breech extraction. Patient died.
4. Puerperal sepsis	3	Cervical pack induction; norm. del. Saprophytic infect. of uterine clot.
5. Puerperal sepsis	1	Version and breech extraction; vaginal pack for postpartum hemorrhage.
6. Phlebitis of left leg	3	Breech extraction; vaginal pack for postpartum hemorrhage.
7. Puerperal sepsis	1	Manual dilatation; ver. breech extraction; vag. pack for postpartum hemorrhage.
8. Puerperal sepsis Phlebitis of both legs.	7	Cervical pack induction; membranes ruptured; ver. and breech extraction.

We can attribute all of these infections to excessive manipulation especially in the home under bad conditions.

METHOD OF PLACENTAL DELIVERY

Table VI offers a summary of the manner in which the placenta was delivered and the condition of the membranes.

TABLE VI

METHOD	NO. OF CASES	PERCENTAGE	CONDITION
Spontaneous	31	39.24	1 case torn, but complete.
Manual separation	15	19.00	5 cases torn, but complete.
			1 case adherent and fibrotic.
Modified Credé	13	16.45	3 cases torn, but complete.
Credé	19	24.05	3 cases torn, but complete.
Unknown	1	1.26	not known.

Hitschmann[7] in a summary of 2548 cases finds that manual separation of the placenta was performed in 11 per cent of the cases. Out of a

series of 51 cases, Schroeder at the Woman's Clinic of Münich, gives the following as the methods of placental removal.

Spontaneous	5 cases
Credé expressed	16 cases
Manual expressed	26 cases
Previously removed	3 cases
Modified Credé	1 case
Removed per operative wound	13 cases

In 12 of our cases the membranes were found to be badly torn. They were complete in all of the cases and adherent and fibrotic in but one case. Our statistics for manual separation are slightly higher than those of Hitschmann, but considerably lower than those of Schroeder.

WASSERMANN REPORT

A Wassermann was taken on every mother on entrance to the hospital. The report on the entire group of cases was negative.

CONCLUSIONS

1. Placenta previa in general hospital practice occurs about once in every one hundred cases.

2. Although no definite etiology can be given, the factors of multiparity, endometritis, closely repeated pregnancies, and recurrent infections are of prime importance.

3. Placenta previa is most apt to occur at the third decade of life.

4. Although the three types of placenta previa occur in about the same proportion, the centralis type carries with it the greatest maternal and fetal mortality.

5. Abnormal presentations are common, occurring in 11.3 per cent of the cases.

6. Hemorrhage is the most striking symptom. All types of placenta previa cause profuse antepartum bleeding. Postpartum bleeding occurs in 36.70 per cent of the cases.

7. The fetal mortality is 64.55 per cent. However, 58.82 per cent of the cases are prematures; and 58.82 per cent are also stillbirths, this tending to raise the mortality rate higher than it really is.

8. The maternal mortality is 13.79 per cent. Exsanguination and shock are the two prime causes of death. It must be remembered that the majority of the fatal cases were bad risks prior to entrance to the hospital.

9. The method of choice for delivery is that of version and breech extraction. This should be preceded by bag induction.

10. Puerperal sepsis can best be avoided by reducing the number of vaginal examinations to a minimum; and also refraining from any manipulation under unfavorable circumstances.

11. Neither syphilis nor the size or shape of the pelvis had any influence upon the causation of placenta previa.

12. Early competent consultation will help reduce both the maternal and fetal mortality rates.

NOTE.—I wish to express my thanks to my chief, Dr. W. E. Welz, for his many suggestions and criticisms.

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THE PROTECTION OF THE PERINEUM

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THE purpose of this paper is to relate observations and studies made during the past five years on the protection of the perineum. The points that have been considered to play an important rôle in the preservation of an intact or nonlacerated perineum are the following: (1) anatomy of the vulva and perineum, (2) age of the patient, (3) the angulation of the pubic arch, (4) size of the fetus, (5) previous injuries to soft parts and subsequent formation of scar, (6) presentation and position of the fetus, (7) the use of general anesthesia, and (8) the intervention performed.

The anatomy of the vulva and perineum.—The classical description of the vulva and perineum may be found in the textbooks of general anatomy. It is important, however, to point out different degrees of development of the vulva in regard to adipose and muscular tissue. The presence of edema and varicosities and of too much fat is important. Again the distance from the fourchette to the anal opening should be taken into account; thus we may differentiate between a high or a low perineum. Personally, I call a perineum high which measures from one and one-half to two inches, and low one that measures less than one inch. The low perineum is the more frequent, being observed in 217 cases out of 257 in this series.

The age of the patient.—The ages of our patients varied from thirteen to forty-six years, both primiparae and multiparae. The youngest primipara was thirteen years old and the oldest, thirty-eight. The tissues of younger individuals have a higher degree of elasticity than those of the older.

The angulation of the pubic arch.—As bone diseases are very seldom met with in the Philippines, acute angulation of the pubic arch is rare. When it is present, as in two of our cases, the transverse diameter of the pelvic outlet becomes narrowed, being 8.75 cm. in one and 9.25 cm. in the other. A wider angulation obviously affords more chance for the perineum not to be lacerated.

The size of the fetus.—The largest babies I have delivered weighed 4,280 and 4,000 grams respectively, both born of multiparae. The latter caused a very deep perineal laceration, though the patient had an old tear; while the larger one did not even produce injury of the fourchette. This can be explained by the fact that the mother of the former baby was smaller than that of the latter, also because her vulva was flat, having no well developed muscular and adipose tissue.

Previous injuries to the soft parts and resulting scar formation.—A badly repaired perineum is predisposed to laceration on subsequent deliveries. Badly repaired is a perineum in which it is seemingly restored but which is not supported from beneath by good union of the muscular and fascial tissues. The slight trauma produced by a descending head is enough for this kind of perineum to give way. Again there were repaired perineums observed in which there was good union of muscular and fascial as well as of mucosa tissues but in which the edges of the laceration were not properly united. In such cases, during subsequent delivery, the dilatation of the perineum and labia will not be uniform and the part subjected to a higher degree of tension is predisposed to tear. The scars formed after perineal laceration are, as a rule, not extensive unless the lacerations were deep or had become infected. In this connection I would like to mention two cases of extensive cicatricial tissue around the vulva. One of them, produced by a large burn on the vulva and vagina, extended above the level of the symphysis laterally into the inguinal regions and downwards to the anus. The external genitalia represented a keloid mass causing an almost complete atresia of the vaginal orifice. When the nurse called for me she told me that there was a patient delivering through the anus, evidently the anal opening being more dilated than that of the vagina. Those familiar with obstetric practice in the Philippines cannot fail to know that so extensive a keloid could only be accounted for by our "saklab" practice by which the puerpera in the fourth week shuts herself in a well-closed room and sits above a red-hot iron or an elongated stone which, by dropping water or vinegar on its surface, generates a good amount of smoke. Undoubtedly this woman, by mistake or by loss of equilibrium, flatly sat upon it. The other case of extensive cicatricial tissue formation was a para ii, attended by a "hilot." The perineal tear must have been extensive, unrepaired, and infected.

Cicatricial tissue ran along both lateral vaginal walls and in the median line just above the anus. The vaginal orifice was very much reduced in size.

The presentation and position of the fetus.—The majority of our cases were vertex presentations, but we had three face, one brow and three shoulder presentations. The position and presentation of the fetus and its mechanism must be well understood by the attending physician, both for a normal labor and for performance of any obstetric operation, especially a forceps extraction.

The use of general anesthesia.—Chloroform and ether were invariably used in this series. The patients were not completely anesthetized unless instrumental delivery, podalic version or breech extraction was to be performed. The purpose of giving anesthetics is to relax the entire muscular system so that also the best results will be obtained so far as the preservation of the perineum is concerned.

The intervention performed.—Obstetricians always realized the importance of perineal protection. Some older accouchers introduced fingers into the anus to lift the head upwards. Later, episiotomy was introduced and an incision was made when the laceration seemed imminent. This operation now is very popular, a practice with which I cannot agree. In this series the methods of deliveries were as follows: spontaneous 197, forceps 51, breech extraction 6, podalic version 3, episiotomy 2, hebeosteotomy 1, craniotomy 1.

In the beginning of my practice I confined myself to the Ritgen method. During a contraction the patient is asked to open her mouth so that she cannot bear down and the baby then is delivered in the interval between two contractions. I used routinely a few drops of chloroform to obtain merely an analgesic effect so that the patient could be given instruction and would cooperate during the perineal stage. Cooperation on the part of the patient during this stage is just as important, if not more so, than the part played by the physician. I have found that very strong pressure against the advancing head is a disadvantage. The important point is merely to give proper support to the perineum in such a way that the tension and distention of the perineum become more evenly distributed. To do this it is of prime importance not to use force or pressure which is greater than that of the descending head, or inevitably the section of the perineum between the head and the hand will be crushed and must tear. Following this line of reasoning, I have allowed the head to dilate the perineum gradually and when the parietal bones are in sight, a few drops of anesthetic are given during the acme of the contraction, at the same time care being taken to have the entire vaginal orifice dilate slowly by gently pushing back its edges over the head. It is necessary to delay expulsion for at least ten minutes

to obtain an intact perineum. DeLee states that as the result of our desire to preserve a perineum, we might deliver an asphyxiated or stillborn baby. He is partly right and I agree that in prolonged labor, where the fetus invariably suffers, and in other cases in which the fetus is likely to be asphyxiated or dying, it is necessary to do a rapid extraction without special regard for the perineum. In endeavoring to preserve the perineum it is important for the attending obstetrician to be very patient. The procedure entails for him careful and continuous work, and for the parturient prolongation of her suffering. An analysis of our spontaneous deliveries shows: Total number of cases 197, lacerated, second degree 35, lacerated, first degree 16; no laceration 146; fetal death 2. Almost 70 per cent of our cases were delivered without laceration. Williams states that two-thirds of the primiparae and 10 per cent of the multiparae sustain lacerations during delivery. In our cases there were only three multiparae, one having a badly repaired perineum and the other two having big babies.

The breech extraction and podalic version cases were all primiparae. Of the nine cases, two had a second degree laceration, four first degree, and three remained without any laceration. In one of the shoulder cases there was one stillborn child, dead before the podalic version was performed. The other two cases of shoulder presentation were brought to the hospital immediately after the prolapse of one arm. The cord in both cases did not suffer from compression. Episiotomy was performed only in the one patient with the extensive keloid of the external genitalia from a burn and the other with extensive scar formation. In the keloid case incision at the median line downwards was found not to be sufficient, so another incision to the left side laterally upwards had to be made to deliver the baby. The patient had fever for one week before labor started and she died from sepsis the following day. In the case of extensive scar formation, after splitting the bands along the lateral wall of the vaginal canal, another short incision was made in the median line. Low forceps was then applied. The hebeosteotomy and craniotomy cases were two primiparous women having pubic arches with acute angulations. The first patient entered the hospital after premature rupture of the membranes. The fetus was alive. In the latter case the fetus was macerated. In both cases second degree perineal tears occurred in spite of the enlargement of the pelvic dimensions in the one case and reduction of the head in the other. The weight of the living baby was 2,910 grams, well within the normal limits of Filipino babies. At present I feel that in a case of narrow outlet with a somewhat overdeveloped baby we should give preference to abdominal section,

especially if the hebeosteotomy is likely to cause a dangerous gap of more than two centimeters.

The first application of low forceps that I performed was in a multipara with almost second degree old healed perineal tear, which I lacerated further in my operation. The second was again on a multipara who was not put under general anesthesia because she was a tuberculous patient. This time I did not further lacerate the perineum. The fault in the first case was too rapid extraction, believing that the fetus would suffer too much, and some nervousness of the beginner. During the last two years I have learned that application of a low forceps offers the best means of delivery for a primipara. It not only enables us to protect better the perineum but also to shorten and lessen the pains of the second stage. By putting the patient under complete anesthesia we cause all tissues to relax and we can make slow tractions. The vaginal wall and perineum thus are dilated gradually and undue tension is avoided. Finally the edges of the vulva orifice are carefully pushed over the head. The expulsion of the head is entirely controlled by the operator.

Of the 51 cases of forceps extraction 6 sustained a second degree and 10 a first degree tear; the rest, 35, did not have any laceration. There was no fetal death among them. All tears were properly sutured and found well coaptated after healing.

The importance of a good perineum after childbirth cannot be overemphasized. Most of the uterine displacements and prolapse seen in the Philippines are chiefly due to relaxation of the perineal floor and the custom of early return to the daily work. The best prophylactic measure, therefore, is avoidance of tears. My own results prompt me to advocate the application of low forceps both for shortening the second stage and as a better means of protecting the perineum, especially in the presence of a high perineum. Forceps application also can be advised as a means of relieving greatly the patient's suffering.

THE VOMITING OF PREGNANCY, ITS CAUSATION AND ITS TREATMENT BY OVARIAN EXTRACT*

By Philips J. Carter, M.D., F.A.C.S., New Orleans, La.

INDIFFERENCE to the vomiting of pregnancy by looking upon it as a natural physiologic consequence of the pregnant state has led to many catastrophes. That the pregnant woman must vomit, a theory casually accepted by many physicians, is erroneous, for statistics prove that some two-thirds do not, though why some endure the ordeal and others escape is still an unsolved problem. Whatever the facts, however, the condition should never be looked upon as purely physiologic, but should be treated as pathologic from its inception.

Theories are constantly being advocated as to its causation, and they are so numerous that, as one writer says, "It would be a useless task to detail at length the theories which have been advanced to explain the disease. Indeed, it may safely be held that the supposed necessity of providing a theory which would explain all the facts of the condition has done more to surround it with obscurity than even the difficulties of the subject itself. If any real advance is to be made, it can only be by adopting a humble attitude, by admitting that we are only on the threshold of the inquiry, and by a careful observation of the clinical facts, without drawing from them too positive deductions."

It is not my intention in this brief paper to outline all the theories and treatments which are advocated in connection with the vomiting of pregnancy, but to deal only with those which have seemed to me to be most reasonable. The three theories which are possibly the most popular, the absorption theory of the products of gestation, the endocrine theory, and the metabolic disturbance theory, like many others, seem to show the effect and not the cause of the pathology, and if any of them is eventually to be accepted as the explanation of vomiting of pregnancy, it will only be when more conclusive investigations have been done than are at our disposal at present.

The simple nauseas of pregnancy, without vomiting, may be due to various factors, neuroses of various types, displaced uteri, cervical erosions, adhesions, even constipation. This type is frequently checked by simple, suggestive measures, such as gradual dilatation of the cervix, replacing a displaced uterus, or local treatment of a cervical erosion, and the success of such measures would seem to prove that the condition is not essentially a pathologic one. When the discomfort passes beyond this state, however, and the vomiting becomes more than the familiar "once a day, early in the morning type," then we are

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, January 14, 1926.

dealing with a pathologic condition, and as such we must look both for the etiology of the disease and for some successful method of combating it.

To glance briefly at some of the theories which have been advanced to explain the vomiting of pregnancy, Bourne of Great Britain contends that a toxin is constantly being produced by the growing ovum during pregnancy and is absorbed by the maternal circulation, so that the ovum constantly poisons the mother, but that in all healthy mothers most of the toxin is effectively counteracted by their own immunizing efforts. Schmoll definitely proved that foreign fetal protoplasm was conveyed into the maternal circulation when he demonstrated the presence of small pieces of syncytial protoplasm in the circulation, and he agrees with Bourne that a biologic defence is set up by the maternal tissues to battle the invasion.

Abderhalden demonstrated that the maternal blood contained a specific ferment capable of digesting placental protein, while Theis and Lackemann demonstrated the sensitization of maternal serum to that of the fetus, and also that of the placenta. Young demonstrated this experimentally with postmortem findings identical with those of eclampsia.

Williams quotes Veit in a rather plausible theory, to the effect that in normal pregnancy varying amounts of fetal ectoderm and even fragments of chorionic villi are constantly becoming separated from the placenta and gain access to the maternal circulation, the process being designated as "deportation." Veit contended that the fetal elements give rise to a poison, which he calls syncytiotoxin, which is normally rendered immune by a supposititious antibody, syncytiolysin, which develops in the maternal serum. If, however, for any reason the former is present in quantities too great to be neutralized, or if the elaboration of the latter is interfered with, symptoms of poisoning result and toxemia eventually follows.

Hofbauer emphasizes the fact that the pituitary and suprarenal glands play an important part in the pathogenesis of pregnancy, and adds that the hormones from these glands affect the brain, kidneys and stomach. He therefore considers ovarian extract almost a specific for this pathology, claiming that it inhibits the action of the pituitary and suprarenal glands on the sympathetic nervous system, but paralyzes the excessive functioning of the pituitary-suprarenal system, and, reasoning along the same general lines, he prohibits the employment of morphine and pituitary extract.

Ingenious as are these theories, and numerous others which we might mention, it is obvious that they are still open to attack from various angles, and that, until a more satisfactory explanation is advanced, we must continue to treat vomiting of pregnancy exactly as we have in the past, empirically and almost in the dark. No matter what ex-

planation we accept, however, one point is clear, that prevention of the disease is better than its attempted cure. The maternal organism is already under a definite strain, and any pathology, no matter how slight, adds further strain, so that disaster may result unless effective methods are employed as soon as possible. This cannot be too much stressed because of the treacherous nature of the disease. It is apparently a simple, unimportant matter, the response to simple measures is usually good, and too many women are themselves prone to accept it as the inevitable consequence of their pregnant state. Often, almost before it is realized, a grave pathology has arisen from what was originally considered a minor discomfort. To prevent the simple from becoming the complex by careful watching and by treating the condition in its incipiency, especially in the nausea stage, should therefore be the criterion of any system of treatment which is advocated.

For approximately ten years I have been particularly interested in this condition, and have evolved a plan of treatment which has given me almost uniformly good results. For purposes of convenience I have considered three types of cases, depending upon the gravity of the condition: first, mild cases, those who gag and are slightly nauseated, or who vomit occasionally; second, moderately severe cases, those who are frequently nauseated and who vomit several times a day; third, severe cases, those who ultimately develop pernicious vomiting. In all types the treatment is based upon the use of ovarian extract, the administration varying according to the classification of the disease.

In the mild cases 5 gr. tablets of ovarian extract (whole ovary) are given every three hours until the symptoms cease. The patient is instructed to take only liquids until the nausea passes, after which solid food is taken as desired. If there is no response to this treatment, the patient falls under the head of the moderately severe type, and is treated accordingly, so that the treatment in any individual case may vary from that given in the mild to that given in the severe type.

In the moderately severe type the same treatment is again used, but the ovarian extract is given in ampule form by hypodermic. One cubic centimeter is given daily until the nausea and vomiting have ceased, after which the treatment is continued for another week. This last point is rather important; in my earlier cases I found occasional patients who would stop vomiting for several days and then would begin again. Apparently the system was not sufficiently saturated with the ovarian extract, for in every instance the additional dosage checked further trouble. Each cubic centimeter of ovarian extract in ampule form contains the water-soluble active bodies from 30 gr. of whole fresh ovary.

In the severe type the treatment consists of hypodermic injections of ovarian extract in conjunction with hypodermic injections of phenol-barbital sodium (luminal sodium). The patient is kept in bed; nothing

is given by mouth; glucose is administered per rectum, and hypodermoclysis is given according to the indications of the individual case. One c.c. of ovarian extract is given every two hours, and 1 gr. of luminol sodium every three hours, both by hypodermic. This treatment is continued for forty-eight hours. If at the end of that time no improvement is observed, glucose and insulin are given according to the methods of Titus and Thalheimer.

In a previous paper, published in 1917, on the treatment of the vomiting of pregnancy with ovarian extract and corpus luteum, I reported 20 mild cases with 100 per cent relief. Since then 20 more cases have been added to this group. In three of these the treatment failed entirely, but through eliminative measures the patients were carried to full term. Three others aborted spontaneously.

In the moderately severe classification there are 26 cases, with four failures. Two of these responded to treatment by hypodermic injections of luminal sodium and went to term. One responded to eliminative measures, and one required a therapeutic abortion; details of this case are given in the appended reports. Another patient aborted as the result of an overdose of paregoric. The dosage in this series ranged from 2 to 38 ampules in daily doses of 1 ampule. Twenty-three of the patients required from 2 to 12 doses, and three from 24 to 38. Recently I have used the tablet form of luminal sodium in six cases of this type, with one failure; this patient later responded to three 1 c.c. injections of ovarian extract over a period of three days. The luminal sodium was administered in half grain doses three times a day, thirty minutes before meals.

The severe type, leading to pernicious vomiting, is discussed in the appended case reports.

In justification of this mode of treatment, which in my hands has given satisfactory results, I would advance the following experimental data: Dixon tells us that the injection of ovarian extract causes an immediate secretion of pituitrin into the cerebrospinal fluid, and in a more recent article he and Marshall have shown that the presence of a corpus luteum of pregnancy inhibits the activity of the ovary, but that before parturition begins there appears to be a sudden rush of pituitrin into the cerebrospinal fluid, which, entering the circulation, helps to empty the uterus and to start the flow of milk. From this it seems to me justifiable to assume that the hormone from the ovary may at times reach an excess, throwing more pituitrin into the organism and therefore producing some of our obscure abortions. It is likewise reasonable to assume, on the contrary, that there are some instances in which the ovary fails to produce a hormone, no pituitrin is secreted into the cerebrospinal fluid, and as a result a toxemia follows, which may be neutralized by saturation of the patient with ovarian extract.

CASE REPORTS

CASE 1.—Para i, aged thirty-one years. First consultation five weeks after a missed period, for acute ptyalism. Two days later nausea and vomiting occurred simultaneously. Treatment in this instance was extremely difficult, as the patient was a working girl, and, contrary to my advice, she insisted on continuing her work. I gave her ovarian extract in ampule form over a period of thirty-eight days, but without much benefit; she was able to take small amounts of liquid nourishment, but continued to vomit several times daily. At the end of this time she was so weak that she was obliged to follow my advice and give up her work. Vomiting was so severe and frequent that she could retain nothing by mouth. She was admitted to the hospital and the routine treatment begun; nothing by mouth, a continuous glucose drip, and absolute rest. She was given 1 gr. of luminal sodium every three hours and 1 c.c. of ovarian extract every two hours, both hypodermatically. At the end of twelve hours she showed considerable improvement, whereupon the ovarian extract was discontinued, and the luminal was given three times a day. At the end of twenty-four hours the vomiting had stopped entirely, and she was put on soft diet. She remained in the hospital ten days, because of her weakened general condition, during which time the luminal was continued. Her pregnancy thereafter was uneventful.

CASE 2.—Para ii, aged twenty-six years. First pregnancy normal. I saw her in consultation at the end of two weeks of practically continuous vomiting, so severe that even water could not be retained. Her physician had given her ovarian extract by needle once a day during this entire time, with no perceptible improvement. When I saw her she was delirious, dehydrated, with drawn facies and pinched nose, and vomiting blood. The temperature was 101 and the pulse 120. Therapeutic abortion was advised, but for religious scruples was immediately refused. Everything was thereupon withdrawn by mouth, a continuous drip of glucose and soda bicarbonate was instituted, ice caps were applied to throat and abdomen, and hypodermoclysis was given every four hours. In addition she was given 1 gr. of luminal (crystal) every three hours and 1 c.c. of ovarian extract every two hours, both by needle. Twelve hours later the vomiting was checked, and nourishment was taken in small amounts. Active treatment was continued as above, except that hypodermoclysis was stopped. At the end of seventy-two hours all treatment was withdrawn except the hypodermic medication, which was continued three times a day. The patient was normal on the fourth day and allowed to be up on the fifth, the hypodermic medication being continued three days longer. A mild recurrence of the vomiting ten days later was easily controlled by daily injections of luminal sodium and ovarian extract. Further pregnancy without incident.

CASE 3.—Para v, aged twenty-five years. First three pregnancies accompanied by nausea but no vomiting. Fourth pregnancy terminated in therapeutic abortion, because acute yellow atrophy of the liver developed in spite of treatment by elimination and ovarian extract in hospital. In this, her fifth pregnancy, nausea and vomiting developed simultaneously and could not be controlled, although ovarian extract and luminal sodium were given by hypodermic over a period of a month, three times each day. Eliminative and constitutional measures were also employed, without effect, and hospitalization, with infusions of glucose and insulin likewise failed. When characteristic urinary findings developed and she began to turn quite yellow, the condition was so obviously a beginning recurrence of her previous malady that I considered further delay dangerous, and therapeutic abortion was therefore done at once.

MEDICAL BUILDING.

(*For discussion see page* 866.)

CISTERN PUNCTURE IN INTRACRANIAL BIRTH INJURIES

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THE value of cerebrospinal drainage in the diagnosis and treatment of intracranial birth injuries is admitted by most authorities. In a consideration of this subject, certain features of the pathology and the disturbance of function should be noted.

The usual lesion is an intracranial hemorrhage. Edema of the brain may be an important complication, however; or at times it may be the only finding. Vital disorders are due most frequently to an intracranial pressure from hemorrhage or edema. Sometimes traumatic shock and depletion of the general circulation from bleeding within the cranium are important factors in the morbid condition.

Hemorrhages are located most frequently in the subarachnoid spaces over the cerebral and cerebellar surfaces. The source of the bleeding is usually from torn meningeal vessels or from lacerated sinuses or their tributaries, in association with tears of the tentorium or falx, incident to labor.[1] Intraventricular hemorrhages from lesions of the choroid plexus, as well as localized epidural hematomata in association with fractures of the cranial bones, occur infrequently.

The wall-like function of the tentorium, which separates more or less completely the cerebral from the lower subarachnoid spaces, has an important bearing on the location of a hemorrhage in respect to treatment.

THERAPEUTIC AND DIAGNOSTIC CONSIDERATIONS

The earliest attempts at relief from hemorrhage and pressure were made by the use of decompression. Death usually followed, due apparently to the multiplicity of the vascular tears, the impossibility of locating and repairing them, and the conversion of the closed subarachnoid space into an open one with a total release of pressure at the bleeding points. Later, it was found that lumbar puncture offered a means of control of the pressure within physiologic limits in many instances until the bleeding stopped spontaneously, with a record for recoveries far better than that from decompression. Decompression, however, may be the only hope for relief in lesions above an intact tentorium and inaccessible, therefore, to drainage from below.

Many babies with intracranial hemorrhage fail to receive benefit from lumbar puncture because only dry lumbar taps have resulted. In other instances only a little blood, possibly from punctured vessels of the spinal plexus, has been obtained. This experience has been so

common that some clinicians[2] consider lumbar puncture to be of little value as a means of relief. It is not certain whether these dry taps are due simply to failure to enter the spinal subarachnoid space of the newborn infant or to clotting of the escaped blood in the canal. Undoubtedly the element of personal skill enters into the matter somewhat, but clotting also must be a factor in late cases of intracranial bleeding of severe degree.

It is a common observation that during an attempt to obtain spinal fluid, even in normal babies, the needle often injures the vascular spinal plexus with a resultant drainage of blood. From this fact confusion arises frequently in the diagnosis of cases of suspected birth injury in which blood is found in the lumbar fluid as to whether or not this blood really comes from the cranial cavity.

CISTERN PUNCTURE

In instances of suspected birth injury with dry lumbar taps or blood of uncertain origin in the spinal fluid, it has been my practice during the last two years to puncture the cisterna magna. At this latter site the fluid is practically free from contamination of blood from the operation itself, because the blood vessels are principally extradural at this location. The desired amount of fluid is always easily obtained, more direct access to the site of the trouble is gained, and all danger from hernia of the brain is obviated. The technic is safe in trained hands and is also easily acquired. About the same time that my earliest cases were undergoing treatment by cistern puncture, Brady[3] employed, independently, the same method in two cases.

The technic of cistern puncture has been described by Wegeforth, Ayer and Essick[4] in their original contribution. The application to infants has been set forth clearly by Porter and Carter.[5] In newborn infants the usual landmarks are often ill-defined because of changes in the shape of the head and neck from molding, edema or other trauma. My preference in the infant, therefore, is to modify somewhat the foregoing technic. After the usual surgical preparation and anterior flexion of the head in the midline, the approximate position of the posterior rim of the foramen magnum is located by deep palpation. The ordinary lumbar puncture needle is then inserted a few millimeters above this point in the midline and in line with the glabella until the occipital bone is touched. The needle is then displaced downward, carrying the soft tissues with it, until the point of the needle slips under the posterior rim of the occipital bone. The needle is then cautiously pushed forward and upward, in line with the midpoint between the glabella and the anterior fontanelle, until the sudden "give" of the needle indicates the piercing of the occipito atlantal ligament, and withdrawal of the obturator should be followed by drainage of fluid from the cistern.

After a preliminary practice on the recent cadaver, no extraordinary difficulty should be experienced in the operation. Although the potential danger of injury to the medulla is seemingly great, the practical risk seems to be very slight. In 1985 cistern punctures on 450 collected cases by some fifty physicians, Ayer[6] was unable to trace any vital injury to the puncture itself. In my series of 78 cistern punctures on 25 infants and children for various therapeutic and diagnostic purposes during the last four years, no harm has ever been observed. One of these infants sustained 26 cistern punctures without apparent harm, while under treatment for cerebrospinal fever with

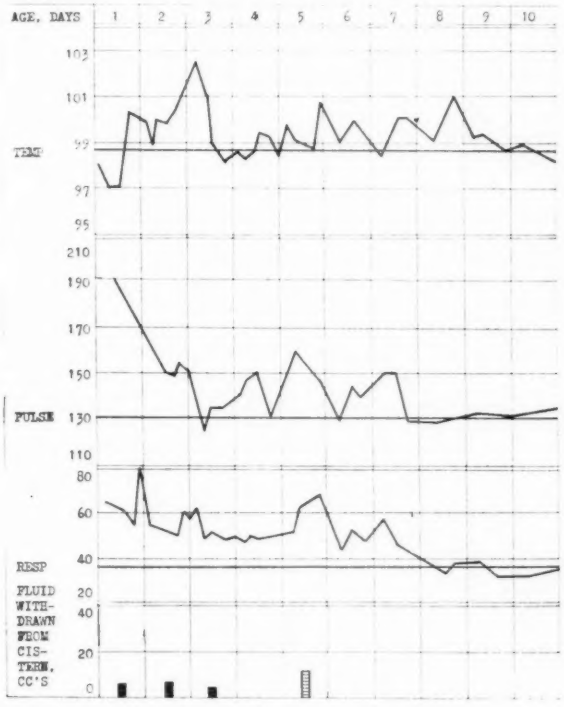

Chart I.—Case 1. Clinical course of basal intracranial hemorrhage with spinal block, treated by cistern puncture. Recovery. Solid blocks, whole blood; shaded block, part blood.

spinal block. When the vital significance of birth injury to the immediate welfare of the patient as well as to later cerebral defects is considered, one may justifiably assume a risk that promises further possibilities for relief and cure.

RESULTS FROM CISTERN PUNCTURE

Ten newborn infants with birth injury have received a total of 27 cistern punctures, ranging from one to eight each, as shown in Table I. Nine of these cases had an intracranial hemorrhage, of which one had a complicating edema of the brain as shown by necropsy. An-

TABLE I

CASES OF INTRACRANIAL BIRTH INJURY TREATED BY CISTERN PUNCTURE

CASE	DEVELOPMENT* OR WEIGHT AT BIRTH	TYPE OF LESION	TIME SYMPTOMS FIRST NOTED	GENERAL CONDITION BEFORE TREATMENT	TREATMENT BEGUN	COAGULATION TIME†	SATISFACTORY PUNCTURES		PRESENT AGE MONTHS	RESULT
							LUMBAR	CISTERN		
1	Normal	Basal hemorrhage	Birth	Critical	Early	Normal	0	5	24	Cured
2	10 pounds	Basal and cerebral hemorrhage	Birth	Critical	Late	Normal	1	8	20	Recovery, defects
3	Normal	Edema of brain	5 days	Critical	Late	Normal	0	1	16	Cured
4	Premature, 4½ pounds	Basal and cerebral hemorrhage and edema	Birth	Critical	Late	Normal	0	2		Died
5	Normal	Basal hemorrhage	3 days	Critical	Early	Normal	0	3	12	Cured
6	Premature, 4 pounds	Basal hemorrhage	Birth	Critical	Late	Normal		1		Died
7	Normal	Basal hemorrhage	Birth	Moribund	Late	25 minutes		2		Died
8	Normal	Basal hemorrhage	3 days	Poor	Early	19 minutes		1	10	**Cured**
9	9 pounds	Basal hemorrhage	1½ days	Critical	Late	Normal		3	9	Cured
10	Normal	Basal and cerebral hemorrhage	1 day	Moribund	Late			1		Died

*Normal development, 6 to 8 pounds. †Normal coagulation time, 4 to 8 minutes.

other baby had only edema. All patients presented manifest symptoms of injury; such as ocular disturbances in all, cyanosis and local twitchings or generalized convulsions in nine, and respiratory, cardiac, or temperature disturbances in eight. The general condition, when the babies were first seen, was classified in one case as poor, in seven cases as critical, and in two cases as moribund.

Preliminary lumbar puncture was done in five cases. Three of these had dry lumbar taps. In Case 2 (Chart II) there was drainage of blood on initial lumbar puncture and a manifest reduction of pressure at the fontanelle. Only dry lumbar taps were obtained afterward, how-

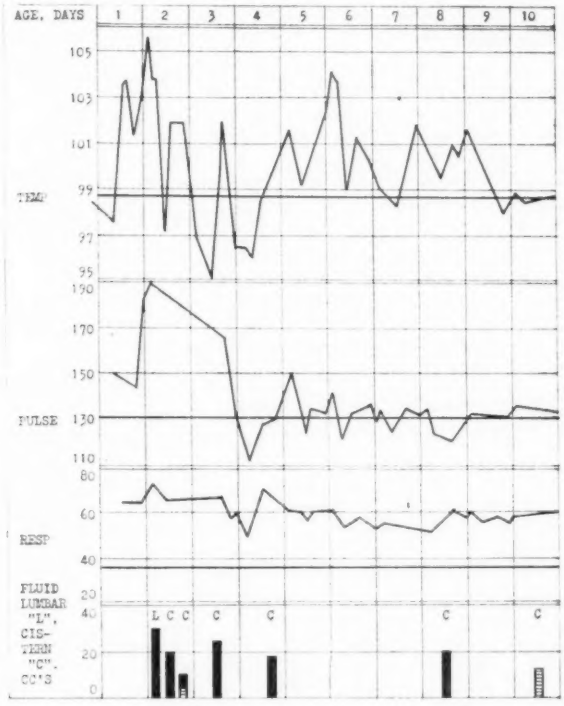

Chart II.—Case 2. Clinical course of severe basal hemorrhage and cerebral injury with spinal block and after one lumbar puncture, treated afterwards by cistern puncture. Recovery with moderate defects. Solid blocks, whole blood; shaded blocks, part blood.

ever, necessitating eight cistern punctures for continued relief from the symptoms of pressure and for eventual recovery. In Case 3 there was blood of questionable origin in the spinal fluid. A clear cistern fluid under increased pressure, obtained immediately afterward, together with prompt and permanent symptomatic relief, established the morbid condition in this case to be one of edema, rather than hemorrhage.

Six patients recovered. Their present ages range from nine to twenty-four months. The mental and physical condition is normal in

all, apparently, except in Case 2 in which there was manifest cerebral injury of moderate degree from the very beginning.

Of the four deaths, two were complicated by prematurity, another by delayed coagulation and moribund condition; the final case was also moribund when first seen.

The beneficial effect of cistern puncture on the color, sensorium and general condition was often prompt and marked. Improvement, if any, was usually evident within an hour and often while the needle was still in the cistern. A temporary increase of the pulse rate was often noted during the first few hours after the puncture; but the characteristic trend of the pulse, temperature and respiration curves was downward, as shown in the charts. Rest, quiet, supportive measures and, when indicated, the treatment of coincident circulatory depletion and shock were essential for recovery.

COMMENT

It is believed that the results from cistern puncture differ in no essential respect from those of adequate cerebrospinal drainage by lumbar puncture. In all instances of failure of drainage by the latter method, from spinal subarachnoid block or missed puncture, however, sufficient drainage may easily be accomplished by cistern puncture.

The diagnosis of basal hemorrhage or edema of the brain may be readily established or disproved by means of cistern puncture in all instances of uncertainty after lumbar puncture with questionable contamination of blood or with dry taps.

By those not well experienced in the technic of cistern puncture, this procedure should be reserved as a method of last resort after lumbar puncture has failed.

In the hands of the pediatrist, preferably, or others well trained in cistern puncture, it may be employed advantageously from the very beginning.

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A CASE OF FETAL DYSTOCIA*

By Herbert Thoms, M.D., F.A.C.S., New Haven, Conn.
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THE following case is reported because of the unusual fetal monstrosity and, more particularly, because of the marked dystocia to which it gave rise at the time of labor.

The patient, an American primipara, aged twenty-one, had been married three years. Menstruation normal; the last period beginning October 4, 1924. Fetal movements were felt on February 26, 1925, and the date of estimated confinement was July 11, 1925. Except for nausea and vomiting, which were present in slight degree during the first three months, the pregnancy was uneventful.

A preliminary examination showed the external pelvic measurements as follows: spines, 25; crests, 29; trochanters, 35; external conjugate, 20; transverse outlet, 9. Because of the rigidity of the perineum, the diagonal conjugate could not be satisfactorily measured. Palpation of the fetal parts was difficult throughout pregnancy, because of the thick abdominal wall, but fetal maldevelopment was unsuspected at any time. The fetal heart, normal in rate and rhythm, was heard without difficulty.

The final prenatal examination on July 17, 1925, showed the patient to be apparently at term. The abdomen was symmetrically enlarged, and while the fetal small parts were not easily palpable, there was no evidence of disproportion. The fetal heart was heard in the left lower quadrant. Upon vaginal examination, the cervix was found two cm. dilated, and the vertex presenting but lightly engaged. A diagnosis of a left occipito-anterior presentation was made. The blood pressure was 130/70; the urine was negative.

The patient entered the Hospital July 24, having contractions which recurred at 2 to 3 minute intervals. She stated that the membranes had ruptured spontaneously two days previously, following which, labor pains began and continued with increasing severity. Because of the rigidity of the contracting uterus, the position of the fetus could not be made out, nor could the fetal heart be heard. Rectal examination at this time showed the cervix fully dilated and the vertex presenting just above the spines. No disproportion could be demonstrated. There was no advance of the presenting part, however, after an hour of severe second-stage pains. Vaginal examination then showed the cervix to be fully dilated, and the membranes ruptured. A small fetal head presented at the spines. Since there was a clear indication for the termination of labor, the patient was anesthetized, placed in the lithotomy position, and forceps applied for an L. O. A. It was immediately apparent, upon locking the forceps, that the fetal head was unusually small for a full-term fetus. Moderate traction failed to advance the head, and it was then evident that some obstruction was present higher up in the birth canal. Accordingly, the forceps were removed. The hand, because of the smallness of the fetal head and the normal size of the pelvis, was then passed without difficulty into the cavity of the uterus. As the examining fingers swept around the child's neck, the pedicle of a large cystic mass was felt in the occipital region. Further examination demonstrated that the cyst, which was the size of a large grapefruit, lay against the child's back and was firmly attached by a thick stalk to the occipital region. Because of its high situation, attempts to puncture the cyst with scissors failed. Accordingly, in the hope that the cystic mass would follow the fetal head, version and extraction was elected as a means of delivery. The procedure was accomplished without difficulty. The patient

*Presented at a meeting of the New York Obstetrical Society, January 12, 1926.

was somewhat shocked by the delivery and by the exhaustion of the long labor, but her symptoms were of short duration. The placenta came away without difficulty, and there was only moderate bleeding during the third stage.

The patient left the hospital in two weeks, after an uneventful convalescence.

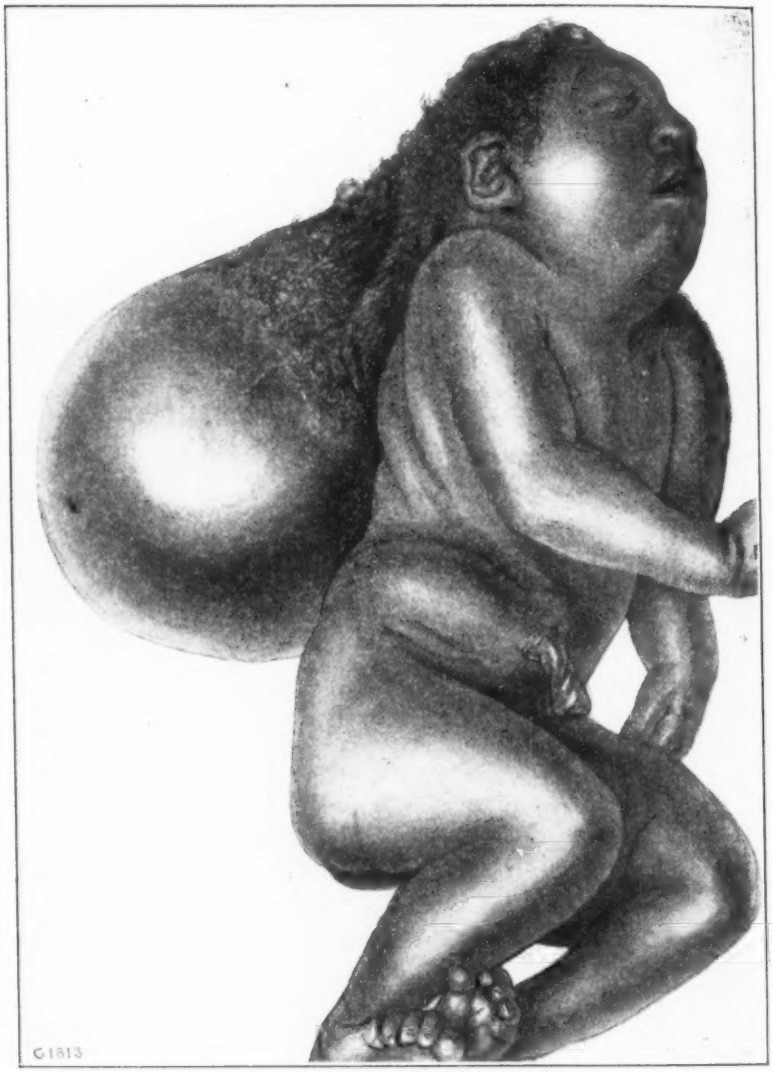

Fig. 1.

The macroscopic appearance of the specimen is shown in the accompanying drawings. It was of the female sex, measured 48 cm. in length and, with the tumor, weighed 4,000 grams. The biparietal diameter was 9 cm., the occipitofrontal 10 cm., the suboccipitobregmatic 8.5 cm., and the occipitomental 10 cm. The viscera of the chest and abdominal cavities were normal in appearance and situation.

The cystic mass was covered by skin, which was continuous with that of the fetus, and the upper third merged with the scalp, as shown in the illustration. The lower

half of the cyst was filled with thin, blood tinged fluid. The upper half was made up of two lobes of brain tissue, covered with dura. The cavity of the cyst communicated freely with the cranial cavity.

The failure to recognize this abnormality during the latter months of pregnancy is explained by the difficulty of palpation in the presence of a thick abdominal wall, together with the facts that the cranial bones of the fetus were well formed and that the tumor mass was soft and fluc-

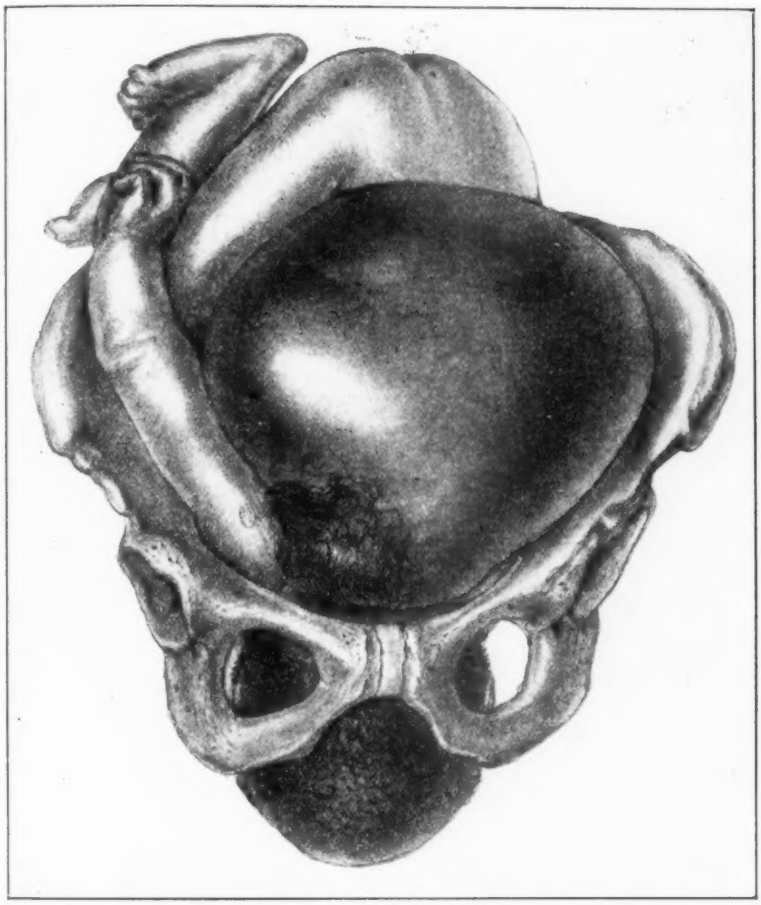

Fig. 2.

tuant. The case is of interest, also, because the degree of dystocia was not appreciated until traction was applied to the head. It emphasizes particularly the dictum "Not Force but Art," as applicable in instrumental delivery where bony disproportion is known to be absent. Finally, it teaches again the lesson that in all cases of dystocia, thorough investigation of the birth canal is indicated before resorting to forcible attempts at delivery.

59 COLLEGE STREET.

(*For discussion see page* 861.)

ABLATIO PLACENTAE*

By Walter E. Welz, M.D., Detroit, Mich.

THIS condition, otherwise known as abruptio placentae, uteroplacental apoplexy, and premature detachment of a normally situated placenta, is more common than was formerly believed. As the toxemies of late pregnancy appear to be increasing in frequency, and as these are the main causative factors of this condition, it behooves us to study the causes, clinical aspects, and care of this condition in order to properly meet the dangers arising in the separation of placentae at or near term.

Harrar reported 254 cases in 100,000 labors in the New York Lying-In Hospital, a frequency of 1 in 395. Cragin, at Sloane Maternity Hospital had 212 cases in 20,000 labors, an incidence of 1 in 94. Holmes reports the clinical frequency as 1 in 500 and the pathologic as 1 in 200. In the past it has been mistaken for placenta previa, the result being that many statistics on this subject are misleading. Also, the partial detachment of a low placed placenta is not easy to distinguish.

In the past five years I have seen nine cases of the severely toxic type. The fetal mortality has been 100 per cent. The maternal mortality has been six (66 per cent). Of these, six were delivered from below and the usual means of combating hemorrhage were followed, i.e., packing, ergot, pituitrin, suturing the cervix. Five of these died, a mortality rate for this method of care for this type of 83 per cent. Two women of the three who had Porro sections performed made uneventful recoveries, though recuperation was slow due to exsanguination and toxemia; one died from exsanguination.

Of the less severe toxic type I have seen seven cases in the same period. The fetal mortality was 100 per cent and no maternal mortality.

I desire to report eight cases which illustrate the various types of ablatio placentae:

Case 1.—Herman Kiefer Hospital. Mrs. E. T., age twenty-nine years, para iii. She was brought to the hospital in deep alcoholic intoxication. She had given birth to two full-term babies normally. No history of previous illness was obtainable. She was sent in by the City Physician because of vaginal hemorrhage.

Her measurements were normal. No edema was present. Blood pressure 120/85; pulse 110; temperature 98° F. (axilla). Catheterized specimen showed albumin and granular casts. The abdomen showed a rather tense uterus, the size of thirty-six weeks' pregnancy. Fetal heart and movements were absent, and fetal parts were not palpable because of the tenseness of the uterus.

*Read before the Detroit Obstetrical Society, Feb. 2, 1926.

The cervix was effaced, the os externum was about 4 cm. dilated and very dilatable, and the membranes were intact. A very dark red watery discharge trickled from between the uterus and the membranes. No placental tissue was palpable.

Diagnosis of ablatio placentae was made and delivery finished at once by easy manual dilatation, rupture of membranes, podalic version and extraction. The fetus, a female, 45 cm. long, weighing 4 pounds, 12 ounces, was stillborn. With the birth of the fetus came the placenta and 900 c.c. of clotted blood.

As the woman was deeply intoxicated, only a few whiffs of ether were given to keep her quiet during delivery. It required only ten minutes for delivery which was well endured by the patient, both pulse and blood pressure being the same after as before delivery.

After delivery a constant oozing of dark red watery blood continued. A catgut suture was placed in a very slight cervical laceration. There was no perineal laceration. The uterus was packed; 1000 c.c. saline solution was given by hypodermoclysis; 10 c.c. hemostatic serum was given intramuscularly, as well as stimulants. Hemorrhage continued through the packing and patient expired three and one-half hours after delivery.

Postmortem examination not permitted.

CASE 2.—Mrs. P. Z., Evangelical Deaconess Hospital, brought in by ambulance June 16, 1925. Patient twenty-two years old, well nourished, had had one normal childbirth in 1923. Her last period was October 19, 1924, and she expected confinement July 26, 1925. She had seen her physician only once during pregnancy. He reported that she had albuminuria and moderately high blood pressure.

At 11 A.M., June 16, the patient took to bed because of severe pain in the epigastrium. She commenced to discharge dark red watery blood from the vagina at 7 P.M. Her physician sent her to the hospital where I saw her at 9 P.M. I found a very pale patient writhing in constant pain which was general over a uterus the size of thirty-eight to forty weeks' pregnancy, but the pain was most accentuated in the epigastrium. The legs were edematous to the hips. Pulse 145; temperature 100° F.; respiration 24; blood pressure 140/115. While being examined the patient vomited considerable blood-tinged vomitus. As she was writhing in pain morphine gr. ¼ was given by hypodermic. No fetal heart or movements observed, and the uterus was so tense that parts could not be palpated. Vagina large, cervix one centimeter long. Os externum admitted two fingers. Membranes intact, cephalic presentation, head floating. There was a continuous flow of very dark red blood from the vagina. No placental tissue could be felt. Diagnosis of ablatio placentae was made and immediate laparotomy performed using ether anesthesia. Incision vertical from 2 cm. above to 12 cm. below the navel. Uterus was very dark in color with ecchymotic spots and marked edema of both broad ligaments. Vertical incision in uterus. In the fundus was found about 1.5 liters of clotted blood in which lay a free placenta. Stillborn male 45 in. long weighing 5 pounds was removed and the uterus emptied of contents. Supracervical hysterectomy was performed, with removal of tubes and ovaries. The patient was in fair condition at the end of operation which took fifty minutes. Blood pressure 85/120; pulse 144; temperature 101. Shock occurred shortly after operation. Patient given 1 liter saline solution by hypodermoclysis, also stimulants.

Patient had a slow recovery with slight septic temperature and was discharged July 6, 1925, twenty days after delivery. She then had blood pressure of 150/105, and the usual urinary findings of chronic nephrosis.

Pathologic report by Dr. Plinn Morse. No evidence of inflammation but numerous small intrauterine hemorrhages.

CASE 3.—Mrs. J. H., age twenty five, para iv, Providence Hospital. I was called by Dr. R. Schaefer to see the patient at her home on the morning of July 10, 1925. She had her first child in 1920, a stillbirth after forceps delivery following forty-eight hours labor. Her second child, in 1922, was a normal delivery after forty-eight hours labor. The child had a small dorsal spina bifida from which it died in seven months. The third child, in 1923, was born normally after forty-eight hours labor. The patient had seen no physician during pregnancy. Her last period was in December, 1924, and she expected confinement September, 1925. During the night of July 9-10 she had severe pain mostly under left shoulder. A considerable amount of blood came away from the vagina, but she had no labor pains. She felt faint and was unable to get up, so a physician was called in the morning. She had vomited during the night.

The patient was a very large woman with a pasty complexion, and marked anemia. The legs had marked edema. The uterus was the size of thirty-eight to forty weeks' pregnancy; it was very tense and tender. No fetal parts were palpable: no fetal heart or movement audible. Temperature 99° F.; pulse 120; respiration 22; blood pressure 145/115. She was sent to Providence Hospital by ambulance. Eight hundred c.c. of saline solution were given by hypodermoclysis. Vaginal examination revealed a large vagina, retained cervix, canal open 1.5 cm., membranes intact, cephalic presentation, head floating. No placenta could be felt. A large amount of very dark fluid blood came from uterus on examination. Blood pressure 135/120. Urine showed heavy deposit of albumin, a trace of sugar, few granular casts. Hemoglobin was 40 Dare. RBC 2,700,000; WBC 15,000; nuclears 72, small mononuclears 26; large mononuclears 2.

Diagnosis of ablatio placentae, and preparation for laparotomy was made.

An incision 13 cm. long was made below the navel. Uterus appeared dark violet with edema of all tissues, especially both broad ligaments which were markedly edematous; dark blue ecchymotic spots over entire uterus. Placenta was found free in the fundus lying in about 1.5 liters of clotted blood. The fetus, a female, 45 cm. long, weighing 3 pounds, 7 ounces, was removed with the placenta and the clotted blood. Supracervical hysterectomy was done.

The patient had an uneventful recovery, except for slight sepsis. She was discharged Aug. 1, 1925, twenty days after delivery. Her pulse was rapid throughout, and was 100 on discharge. Blood pressure 150/110.

Pathologic report from Dr. J. E. Davis showed edema and chronic myometritis with small myometrial hemorrhages. No evidence of acute inflammation.

CASE 4.—October 9, 1920. Providence Hospital. Patient had typical rachitic pelvis. She had had a stillbirth in 1915 after forceps delivery following forty-eight hours' labor. In 1918, after induced labor, a living child, 45 cm. long, weighing 5 pounds, 6 ounces, was born. In 1920 labor was induced at thirty-six weeks by means of a Barnes' bag. In preparation a vaginal douche of 1 per cent lysol was used through an intrauterine douche nozzle. A rather severe hemorrhage followed as the stream was directed to one side. The bag was placed immediately and external hemorrhage stopped. Fetal heart sounds became weak in two hours and disappeared in three and a half hours after placing the bag. No violent movements of the fetus were noted. On expulsion of bag after eight hours, 500 c.c. of clotted blood were expelled. Easy breech extraction of stillbirth male 43 cm. long, weighing four and a half pounds. The fetus was pale, evidencing chorionic hemorrhage. The placenta was evidently attached low on body of uterus and showed signs of being detached on its lower third as evidenced by this part being hardened and covered by very adherent coating of firm fibrinous clot. The low attachment of the placenta allowed

the stream of lysol to separate it from the uterus because of a gaping lacerated cervix.

This is a typical case of the traumatic type of ablatio placentae, which is rather uncommon.

CASE 5.—Mrs. R. A., para ii, forty-one years of age. Providence Hospital, July 23, 1920. This patient had shown signs of nephrosis during pregnancy with slightly elevated blood pressure and characteristic urinary findings. She had edema of lower legs. Uterus was lax, thirty weeks' pregnancy. No fetal heart or movement observed. Constant trickling of dark fluid blood. Uterus was lax, not tender. After five hours labor there was a normal delivery of a female stillbirth, 38 cm. long, weighing 3 pounds. Immediately followed by the placenta with 800 c.c. of clotted blood. Tendency to hemorrhage controlled by uterine massage, 1 c.c. of pituitrin, and 4 c.c. of ergot.

At discharge urine showed albumin and casts. Blood pressure 160/110.

CASE 6.—Mrs. L. S., thirty-two years of age, para i. She was sent to St. Mary's Hospital December 19, 1920 after a profuse hemorrhage at home. Patient was very pale, and almost pulseless. Blood pressure 140/110. Uterus very tense and tender. No fetal parts palpable. There was no fetal heart sound or movement. Cervix effaced. The os externum was 2.5 cm. dilated. Dark red fluid blood constantly trickled from cervix. Edema of lower extremities and albuminuria. Five hundred c.c. of saline solution were given intravenously.

Manual dilatation of cervix which was soft and dilatable. Version and easy extraction. Stillbirth of a thirty weeks' female fetus, immediately followed by placenta and about 1 liter of clotted blood. Hemorrhage continued. Packing, saline by hypodermoclysis and stimulants were given. Death followed two hours after delivery.

CASE 7.—Mrs. J. S., Providence Hospital, Oct. 1, 1924, para ii, age twenty-seven years. In 1923 she had placenta previa at term, a stillbirth following bagging and version. At thirty-six weeks, Sept. 30, 1924, at 11 P.M., very sharp pains started in RLQ, but there was no contraction. These continued constantly through the night. Movements were felt through the night but disappeared early in the morning. In the morning labor had commenced but there was a continuous discharge of dark fluid blood from cervix. Uterus was very rigid, impossible to palpate fetal parts or get fetal heart sounds or movements. Continuous extreme pain and tenderness in RLQ.

Labor pains started 1 P.M., October 1. Complete dilatation at 3:30 P.M., at which time membranes ruptured. Breech extraction of stillborn male weighing 4 pounds, 8 ounces, at 3:40 P.M. At the delivery 600 c.c. of clotted blood came away. The placenta was expressed ten minutes later. A hematoma the size of a pigeon's egg was on the maternal surface, and six smaller hematomas were seen throughout the placenta. One-half of the placenta was covered with a firmly attached clot. The patient had been toxic for two months with albumin in urine and a blood pressure as high as 160/110.

After delivery there was no hemorrhage and recovery was uneventful.

CASE 8.—Mrs. M. A., a primipara, twenty-three years of age, came to Providence Hospital by ambulance January 24, 1926. Sent in as a case of placenta previa because of profuse hemorrhage at home just before midnight. Patient had vomited considerably at home.

The patient was extremely pale, had edema of lower legs, pulse 130, temperature 96.2° F., blood pressure 110 systolic and no diastolic. Uterus distended to xiphoid

though only thirty-two weeks' pregnant. No fetal parts could be felt. No fetal heart sounds or movements were obtained. Exquisite pain and tenderness over entire uterus.

Vaginal examination revealed primiparous birth tract. Cervix effaced with os of 1 cm. dilatation. No placental tissue palpable, cephalic presentation, head floating. From the cervix was a continuous flow of bright red blood.

Porro section was done at 2:40 A.M. under nitrous oxide-oxygen anesthesia. Incision was below the navel. Uterus found spotted with ecchymotic areas, slight edema of broad ligament. A male fetus, 44 cm. long, weighing 5 pounds, 11 ounces, was found floating in about a liter of fluid and clotted blood. Seven hundred c.c. of saline were given intravenously as well as pituitrin and ergot intramuscularly. At 3:20 A.M. the patient was removed to bed in fair condition. Sudden collapse and death at 4:40 A.M.

Examination of uterus showed numerous small hemorrhages throughout the musculature.

COMMENT

Very few cases of ablatio placentæ are of the traumatic type. These are not so dangerous as the toxic type and can be delivered by the natural birth route. The toxic type is more frequent and more dangerous.

The most dangerous of the toxic type are those in which intramuscular hemorrhages occur. These are diagnosed by the tenseness and tenderness of the uterus, together with uncontrollable hemorrhages and shock. Porro section appears to be the only successful method of disposing of this type.

The less dangerous toxic type is the one in which there are placental hemorrhages with hematoma formation. As the uterine musculature is not involved in hemorrhage, it is capable of contracting after being emptied. This type may be delivered through the birth canal. Following delivery uterine stimulants and packing will control hemorrhage. In this type the uterus is not tense or tender but lax before delivery.

497 EAST GRAND BOULEVARD.

PURPURA HEMORRHAGICA COMPLICATING PREGNANCY

Report of a Case in Which Both Mother and Child Were Affected and Recovered*

By Philip Liebling, M.D., New York

PURPURA hemorrhagica complicating pregnancy is a rare condition. According to Hirst,[1] the disease is generally fatal and always interrupts pregnancy, the fetus dying *in utero*. Rushmore[2] in 1925 made a thorough review of the literature and was able to find only forty-seven reported cases of purpura complicating pregnancy, to which he added one of his own.

The first case was reported by Barnes[3] in 1867. This patient appeared to have rheumatic purpura, or Schönlein's disease. During the sixth month of her pregnancy, she suffered rheumatic pains in the joints, lumbago, vomiting, and fever. Labor followed, but the infant lived only three hours. On the day after delivery, the mother had an eruption of purpuric spots on the face, abdomen, and legs. The patient died on the following day.

Rushmore, in his review of the literature, noted the occurrence of purpura hemorrhagica in both the mother and the fetus only seven times. In Dohrn's[4] case, many petechiae were observed during the period of pregnancy, but they disappeared at the time of delivery. The fetus, a female born in the ninth month, exhibited spots that were similar, as to number, size, and color, to those found on the mother.

Recurrence of purpura in a succeeding pregnancy was reported by Greenhill[5] in 1923. His patient had purpura during her first and second pregnancies. In the case reported by Vignes and Stiassnie[6] in 1921, the purpura recurred in three successive gestations during a period of ten years.

Of the forty-seven cases summarized by Rushmore, the final results were recorded in only forty-four. Twenty-six mothers died and eighteen recovered. Of the forty-two infants whose final outcome was reported, twenty-seven died and fifteen survived.

In the thirty-eight cases in which the age was recorded, it ranged from eighteen to forty-three years.

REPORT OF A CASE

A primipara, aged twenty-two, was first seen by me on July 17, 1925, during the seventh month of her pregnancy. The family history was negative for any hemorrhagic tendency. The last menstrual period took place on December 22, 1924.

Toward the end of the fifth month, the patient began to notice some small red

*Read before the Bronx Gynecological and Obstetrical Society, November 30, 1925.

spots on her body and limbs. They appeared in successive crops, the earlier ones fading after a few days. When she brushed her teeth or chewed solid food, her gums bled easily; she also had several mild attacks of epistaxis. The bleeding was easily controlled by local treatment.

On June 20, the patient was seen by a physician, at which time she was covered with petechiae. There were numerous purpuric spots on the extremities. She complained of frequent nosebleed, bleeding from the gums, slight swelling of the feet and general weakness. Her blood count revealed 2,400,000 red blood cells and 45 per cent of hemoglobin. The platelet count was 40,000, an extremely low figure that is characteristic of purpura.

When I first saw the patient, her skin and mucous membranes were pale. There were numerous petechiae scattered over the entire body. Some of the hemorrhagic spots were fading; others appeared to be of recent origin. There was a large ecchymosis on the palate and many small hemorrhagic spots on the gums and the inside of the cheeks. The spleen was not enlarged.

The patient was treated with calcium lactate and saccharated ferrous carbonate, 20 grains of each three times a day. She was also advised as to hygienic and dietary measures.

She returned on July 30, at which time the petechiae and hemorrhagic spots were found to be much fewer in number. Epistaxis was much less frequent than formerly. The red blood cell count was 3,500,000; hemoglobin, 70 per cent. The platelet count had risen to 300,000, a normal figure.

From this time on, the patient's condition improved rapidly. The petechiae became fewer in number and the purpuric spots disappeared, except for a slight ecchymosis on the upper part of the palate. There was a concomitant improvement in the platelet count, as shown in Table I. Epistaxis became infrequent, and the color of the skin and mucous membranes improved. The patient no longer suffered from weakness, and the swelling of the feet and ankles disappeared.

The patient went into labor late September 30, and delivered a girl, weighing eight pounds, eleven ounces, early on October 2. The baby had numerous petechiae over her face, trunk, and extremities. She was somewhat cyanosed but cried vigorously when handled. Nine hours after birth, and again several hours later, the child regurgitated some water mixed with blood. On the following day, she again brought up some blood-streaked liquid. On October 4, bloody urine was passed; on the following day, the stool was streaked with blood. The temperature was 101° F. The baby was then given 5 c.c. of thromboplastin, injected into the buttock.

The baby's blood count on October 5 was 6,000,000 red blood cells and 110 per cent hemoglobin. The platelet count was 40,000. The coagulation and the bleeding time, being short, were not estimated.

The petechiae present on the baby at birth gradually faded, and no new ones appeared. On October 7, there was a slight bloody discharge from the child's vulva.

The mother's blood on October 5 gave the extremely low platelet count of 20,000. The erythrocyte count was 3,400,000; the hemoglobin, 66 per cent. The coagulation time was five minutes. On many previous examinations, it had ranged from seven to eight and a half minutes. The bleeding time was four and a half minutes.

From this time on, there was progressive improvement in the condition of both mother and child. On October 14, when the patients were discharged, practically all of the hemorrhagic spots had disappeared.

On October 23, the mother had a few petechiae on her shoulders and on her left arm and leg. The baby looked healthy and there were no petechiae. On October 30, the mother showed some new petechiae on her shoulders, chest, and lower limbs, and there was an area of ecchymosis about the size of a quarter on the upper por-

tion of the palate. The baby appeared healthy and had gained weight, but there were some petechiae on the legs and ankles. The results of the baby's blood examination are shown in Table II.

On November 27, the mother still had a few petechiae on her extremities, but there were no other signs of bleeding. The baby was healthy, weighed nine pounds, 6 ounces, and showed no petechiae. When the patients were last seen on December 30, they were in perfect health and no petechiae could be found.

TABLE I

MOTHER'S BLOOD EXAMINATIONS

DATE	PLATELETS	R. B. C.	HGB. %
6-20-25	40,000	2,400,000	45
6-25-25	40,000	2,400,000	45
7- 7-25	116,000	2,900,000	59
7-13-25	58,000	2,500,000	66
8- 5-25	300,000	3,500,000	70
8-12-25	370,000	3,300,000	70
8-19-25	330,000	3,500,000	74
8-26-25	285,000	4,000,000	75
8-28-25	285,000	4,000,000	75
9- 9-25	———	2,500,000	75
9-16-25	322,000	3,500,000	74
9-23-25	300,000	3,200,000	71
10- 5-25	20,000	3,400,000	66
10- 8-25	160,000	3,420,000	70
10-31-25	200,000	3,200,000	77

TABLE II

CHILD'S BLOOD EXAMINATIONS

DATE	PLATELETS	R. B. C.	HGB. %
10- 5-25	40,000	6,000,000	110
10- 8-25	No estimation—coagulation and bleeding time short.		
10-31-25	240,000	4,800,000	99

SUMMARY

Purpura hemorrhagica complicating pregnancy is a rare condition, only forty-eight previous cases having been reported. The occurrence of this condition in both mother and child is still more uncommon; Rushmore's extensive review of the literature cites only seven such cases.

The blood platelet deficiency in purpura hemorrhagica complicating pregnancy probably arises from some toxemia of maternal, fetal, or placental origin. The source of the blood platelets is the bone marrow, where they are formed by budding off from the megacaryocytes. The toxic substance may destroy the platelets soon after their formation, or it may destroy the megacaryocytes themselves.

The presence of purpuric symptoms in the offspring is probably the result of the absorption of toxic substances from the maternal blood.

This case is reported as a symptomatic purpura in which a primip-

ara began to show petechiae during the fifth month of pregnancy. The hemorrhagic eruption reached its maximum during the sixth month; then it gradually lessened, but did not disappear until about two months after labor. There was also bleeding from the nose and gums. The child was covered with petechiae at birth and showed a tendency to bleed soon afterward. An extremely low platelet count was found in both mother and child. The mother showed considerable anemia, but the child's red blood cell count and hemoglobin were above normal. Both patients recovered.

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920 Avenue St. John.

SYPHILIS OF THE PLACENTA IN THE NEGRO

A Study Based on 1000 Consecutive Cases

By James R. McCord, M.D., Atlanta, Ga.

(From the Department of Obstetrics, Emory University School of Medicine)

WE OFFER the following work as a further contribution to the fascinating but little understood subject of syphilis in pregnancy. All of the slides were personally studied, at least two from each placenta. As a rule, one was made from the fetal surface of the placenta, the other from the maternal.

As a basis for a syphilitic placenta, we have accepted the changes recently described by Eardly Holland:

1. The villi are uniformly enlarged and closely packed.
2. A reduction of the intervillous spaces.
3. An increase in the density of the stroma and of the stroma cells.
4. Diminished vascularity of the villi.

When the above changes were only partial, we designated the condition as doubtful.

We agree with Holland's statement, that the vessels in a syphilitic placenta are not closed by an obliterating endarteritis, but rather that the villi have never been properly vascularized.

Of the 1000 placentas examined for syphilis, 119 were positive, 35 were doubtful, and 846 were negative.

There were 821 cases that went to full term, and 791 babies were born alive. Of these babies, the placenta was positive in 38 and doubtful in 13. Thirty babies were stillborn at full term; of these, the placenta was positive in 12, doubtful in 1 and negative in 17.

There were 84 babies premature, but born alive. The placenta was positive in 13 of these, doubtful in 8, and negative in 63.

There were 84 (the coincidence is noted) premature babies stillborn. In 50 of these the placenta was positive, doubtful in 7. In 27 cases the placenta was negative. In 8 premature stillbirths, both the cord and maternal Wassermann, as well as the placenta, were negative. There were 3 full-term stillbirths in which Wassermann reactions and placenta were negative.

Abortion occurred fifteen times. The placenta was positive in 5, doubtful in 1, and negative in 9.

A Wassermann test was done on 966 of the women. In 747 the reaction was negative, and in 219 (22.5 per cent) positive. In 119 cases in which the maternal Wassermann was positive, the placenta was negative. In 89 cases, both the maternal Wassermann and the placenta was positive. There were 11 cases with a positive maternal Wassermann in which the placenta was doubtful. The placenta was positive in 24 cases where the maternal Wassermann was negative, and doubtful in 13 cases with negative maternal Wassermann. The Wassermann taken in the prenatal clinic was repeated in the labor room on 396 women. The reaction agreed in 349 cases (88 per cent). In 311 cases both were negative, and in 38 cases both were positive. The clinic Wassermann was positive and the labor Wassermann was negative 26 times; the clinic Wassermann was negative and the labor Wassermann positive 21 times.

The cord Wassermann was done on 655 babies. Of these, 608 were negative and 47 (0.7 per cent) positive. In 35 cases in which the cord Wassermann was negative, the placenta was positive; and in 13 cases with the cord Wassermann negative, the placenta was doubtful. A positive cord Wassermann occurred 26 times with negative placenta. One cord Wassermann was positive in which the placenta was doubtful. In only 20 cases, was the cord Wassermann and the placenta both positive.

The maternal Wassermann was positive 66 times where the cord Wassermann and the placenta were negative.

In 19 babies born alive, the maternal and cord Wassermann were positive and the placenta was negative. In only 12 cases were they all positive. In 20 cases in which the cord Wassermann was negative, the maternal Wassermann and the placenta were positive. The maternal Wassermann and the placenta were positive 11 times where the cord Wassermann was negative. There were 2 stillborn babies where the cord and maternal Wassermann and placenta were all positive. In 6 cases the cord Wassermann was positive, and the maternal Wassermann and the placenta were negative. The cord and maternal Wassermann were negative 14 times where the placenta was doubtful.

We are unable to state whether prenatal antisyphilitic treatment

does or does not influence the histologic structure of the placenta. We were not able to demonstrate a gumma in any of the placentas.

TABLE I

HISTOLOGIC EXAMINATION OF 1,000 PLACENTAS

PLACENTAS	MATERNAL WASSERMANN		CORD WASSERMANN	
	Positive	Negative	Positive	Negative
119 Positive for syphilis	89	24	20	35
846 Negative for syphilis	119	710	26	560
35 Doubtful for syphilis	11	13	1	13

TABLE II

MATERNAL WASSERMANNS

MATERNAL WASSERMANN	CORD WASSERMANN		PLACENTA		
	Positive	Negative	Positive	Negative	Doubtful
219 Positive	32	112	89	119	11
747 Negative	8	470	24	710	13

TABLE III

BIRTHS

BIRTHS	PLACENTA			CORD WASSERMANN		MATERNAL WASSERMANN	
	Positive	Negative	Doubtful	Positive	Negative	Positive	Negative
Full time living	38	740	13	27	528	142	617
Full time dead	12	17	1	5	10	9	17
Premature living	13	63	8	6	51	24	57
Premature dead	50	27	7	3	23	49	43

SUMMARY

Syphilis was demonstrated in 15.4 per cent of the 1000 placentas examined.

In 966 women, the Wassermann was positive in 22.5 per cent.

In 655 babies, the cord Wassermann was positive in 0.7 per cent.

The Wassermann reaction repeated on 396 women agreed in 88 per cent.

Syphilitic placentas were found in 40.6 per cent of the positive Wassermann cases, and in 0.3 per cent of the negative Wassermann cases.

In 84 premature babies born alive, the placentas were positive in 28.5 per cent.

In 84 premature babies born dead, the placentas were positive in 67.8 per cent.

Of 219 positive maternal Wassermanns, the cord Wassermann was positive in 14.5 per cent of the cases.

Of 747 negative maternal Wassermanns, the cord Wassermann was positive in 0.107 per cent.

Of the positive placentas, 75 per cent had positive maternal Wassermanns.

61 FORREST AVENUE.

PREGNANCY IN THE REMAINING HORN OF A UTERUS DIDELPHYS AFTER TORSION AND PARTIAL HYSTERECTOMY

By C. E. Caswell, M.D., Wichita, Kansas

THE following case seemed unique enough to warrant a record in obstetric literature. On January 8, 1924, the patient referred to below was operated upon by Dr. Harry Horn, of this city, and the case described in *Archives of Surgery* of November, 1924. Torsion had developed in the gravid side of this double uterus at about the sixth month without demonstrable cause. A laparotomy was done, the twisted pregnant portion incised, the fetus and separated placenta delivered, and a supravaginal hysterectomy done on the gangrenous half of the uterus. The patient made an uneventful recovery and subsequently resumed her menstrual periods.

The patient, Mrs. S. J., came again for examination March 18, 1925, reporting that her menses had been normal until December 3, 1924, which was her last period, and that she thought she had already felt life. Her pregnancy proceeded normally, both cervices enlarging and softening at about the same rate. On August 18, examination showed the breech in the pelvis. Attempts then and later to do an external version were unsuccessful. September 18, blood pressure being 150/90, and there being considerable edema, castor oil and quinine were administered. Pains began at 10 A.M., both feet presenting, and she was delivered of a six and a quarter pound boy at 7:25 P.M., episiotomy being done and forceps applied to the after-coming head. During the later part of her pregnancy and during labor the fundus was inclined toward the left side of the abdomen. The cervix dilated normally, but up to within a few minutes of the time the feet were delivered, the side where it joined the other cervix had not been drawn up out of reach. Involution was rather slow but she made a good recovery.

110 Northern Building.

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

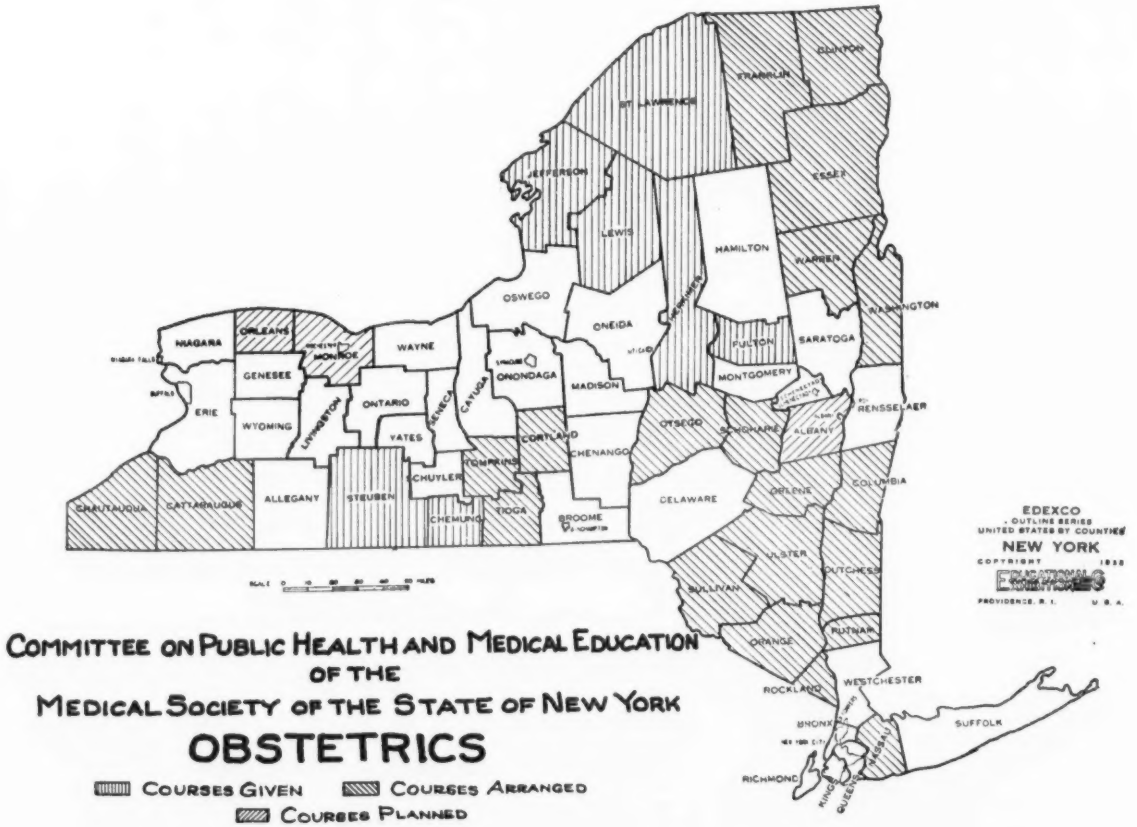
LECTURES IN OBSTETRICS TO COUNTY SOCIETIES IN NEW YORK STATE

AN IMPORTANT activity is being developed by the New York State Department of Health in cooperation with the Committee on Postgraduate Medical Instruction of the State Medical Society. A sentiment has grown among physicians that the steadily increasing group consciousness and the growing desire of organized medicine to assume leadership in the solution of the great problem of public health, fix a very definite responsibility upon the official medical bodies. This particular committee, in its last annual report of the House of Delegates, made in April, 1926, states that the continuous education of the practicing physician is the greatest single contribution that organized medicine can make.

The manner in which this scheme was developed is of interest. The committee as appointed represented all sections of the State and a survey was made based upon answers to a questionnaire sent to the County societies as the units of the organized profession. The officials of these societies were asked what plans they had made or would agree to make for postgraduate teaching and what facilities for the purpose were at hand. A central organization for the collection of this information was developed under the direct supervision of Drs. C. A. Gorden and A. N. Thompson, of the Kings County Medical Society, and an appropriation totalling $5,000 was secured from the Council of the State society. The New York State Department of Health offered its full cooperation and placed the services of its regional consultants in obstetrics and pediatrics at the disposal of the Committee.

Of particular interest in connection with this important work are the courses of six lectures each in obstetrics and pediatrics which were offered to various County societies and which it is a pleasure to record have been well attended. The appended map is a graphic presentation of the work which has been done. The lectures on obstetrics have included prenatal care, management of normal labor, postpartum care, and the pathology of labor and pregnancy, and have been given by various members of the Regional Consultant staff of the State Department of Health, including, among others, Drs. John O. Polak, Frederick W. Rice, Ralph W. Lobenstine, Harold C. Bailey, George W. Kosmak, James K. Quigley, and Arthur C. Martin.

The activity described above is worthy of emulation by county organizations in other states. It presents the subject of better maternity care directly to the attention of the practicing physicians by a method that originates and is carried out within the ranks of the medical profession. It provides for cooperation with various lay agencies, but the essential aim of the movement is an effort to solve a medical problem under medical auspices.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Society Transactions

NEW YORK OBSTETRICAL SOCIETY

MEETING HELD DECEMBER 8, 1925

THE PRESIDENT, DR. O. PAUL HUMPSTONE, IN THE CHAIR

DR. J. A. CORSCADEN read, by invitation, a paper on the **Significance and Management of the Artificial Menopause.** (For original article, see p. 803.)

DISCUSSION

DR. ROBERT T. FRANK.—I think that we should distinguish between the operative menopause and the induction of the menopause by means of radiotherapy in young women, because it is very difficult to find the right sterilizing dose, and a large number of young women who apparently have been sterilized, at some later date, sometimes in a year, sometimes in three years, resume their menstrual function, and thereby show that the sterilization was only temporary.

I would like to make clear just what the menopause is. It is due either to the complete withdrawal of the female sex hormone or to a subthreshold effect. The female sex hormone, being a chemical entity, has an active dose, a dose requisite to produce symptoms. A subthreshold amount may be present and may relieve some of the minor symptoms, which we ascribe to the menopause, and yet be insufficient to produce the cyclic evidence which manifests itself through the menstrual cycle, especially through menstruation itself.

I am very glad to hear Dr. Corscaden say that obesity does not develop, nor do marked changes in appearance, sex characteristics, or the libido occur. I can endorse all these findings. That at the age of twenty-five he would expect basic physical changes, is probably not what he meant to imply, except such physical changes as we actually find locally, meaning thereby atrophic processes which take place in the breast and in the pelvic genital tract.

My findings in regard to arthritis do not agree with his. I think that perhaps "arthritis" is a misnomer. I have not as yet been able to follow it up from the x-ray point of view to see whether or not actual joint changes occur, but the frequency of the new complaint of pain in the shoulder-, elbow- and knee-joints is striking. We are making it our business at present to follow this up more closely in order to see whether actual bone changes do take place.

That the basal metabolism shows no marked evidence of change by means of the clinical methods employed does not surprise me. I agree fully that the flashes are the most marked symptoms. Hypertension, I agree, should be ascribed as much to outside circumstances as to the age.

When we come to the nervous signs, as Dr. Corscaden mentioned, the seven bad cases might have been weeded out if more careful investigation of the patients had been feasible before operation. Very often, even with the presence of nervous symptoms, it may for physical reasons (fibroids or continuous functional hemorrhages) be advisable to produce the menopause.

I also agree with him that the x-ray, in preference to the operation should be used in these nervous types to minimize the shock.

That emotional instability was not at least made worse in but 27 per cent of the cases is most gratifying.

When Dr. Corscaden speaks of the endocrine and the psychiatric school in reference to this question I must differ with him. I am not a modern endocrinologist—I try to keep my feet on the ground—, but I think as far as any menopause effect is concerned it is purely and entirely endocrine. That the effects are no greater than Dr. Corscaden has shown them to be simply means that the endocrine effects are not tremendously marked in the adult.

When he comes to the treatment of neurosis, I think we might sum up by saying that a careful study of each patient in advance may put us in a fairly exact position to judge how such a patient will react to operation or to radiotherapy, the results of which very often bring about shock corresponding to that of an operative intervention. That we are not always in a position to take the time to enter into these questions beforehand is perhaps a reflection on us, but such is often the case.

Now, as to the "inferiority complex" of the female, I have not been convinced by Liebman and others. I have seen as severe cases of, we will say, absence of ovarian function in the most male type of woman as in the smallest, most shrinking mid-Victorian flower. The one thing that we cannot get away from is that in certain individuals—and I will accord that it is in individuals who show some neurotic tendencies, some inferiority of the nervous system, which may show itself on psychoanalysis—vasomotor and local changes take place, but I firmly predict that as soon as I am able to produce an active female sex hormone (which is not so unpleasant and does not produce such severe local reactions that I refuse to give it to the human being), all those symptoms of atrophy as well as the vasomotor symptoms can be relieved at once.

Furthermore, I want to emphasize the point that ovarian extracts cannot possibly do any harm by acting on the suggestibility of the patient. The only good I have ever seen the commercial extracts do was done by suggestion.

In other words, Dr. Corscaden has shown great acumen in weeding the unimportant from the important symptoms. He has shown how rarely important symptoms develop. He has tried to overcome the folklore fear which has existed among the females, by his psychic therapy.

I hope that within a reasonable period we will have an effective drug at our disposal which will to a great degree relieve the ovariophrenic symptoms and yet need not be given in such dosage that it will reproduce the very symptoms for which the patients were originally treated.

DR. HAROLD BAILEY.—This paper, it seems to me, again establishes the fact that the artificial menopause, or at least the one produced by irradiation, is no more severe than the actual one.

I should like very much to have some information concerning the effect of administering ovarian extract to women who, a year or two after sterilization, have marked flashes. Does the administration of this extract tend again to cause flowing?

Some years ago I stated that 1,500 millicurie hours from radium in platinum placed within the uterus was a sterilization dose but I have had to retreat from this position. It is difficult to establish the dose, and I think that in cases in which only a small dose is given, it is exceedingly dangerous to administer the extract, unless one wishes the bleeding to recur. In my cases I postpone the administration of the extract as long as possible, though in a considerable number of cases it is advisable to give it in order to relieve the menopause symptoms.

I disagree with Dr. Frank. I believe that the extract is tremendously effective

in reducing the flashes, so much so that in some cases they are practically absent, and, therefore, I think that it is influential in controlling the menopause symptoms.

I was interested to hear the author say that he had noticed a diminution in the size of the uterus and the cervix. I have not observed this, and I should feel that the dosage he ordinarily gives would not be likely to produce this decrease in size. I have felt that irradiation sterilization led to a milder menopause. I think that the parts of the ovary other than the follicular apparatus continue to work and therefore, from the standpoint of the menopause symptoms, this form of sterilization is preferable to the operative method.

DR. GEORGE G. WARD.—I wish to echo what Dr. Bailey has just said. I entirely agree with his statement and disagree with that of Dr. Frank in regard to the value of ovarian extract in the hot flashes. Dr. Frank, if I understood him correctly, has said that whatever good it did was accomplished entirely by suggestion. I am quite convinced that that is not so. I have several cases in mind where the women did not know what they were taking, and I am quite sure from rather a lengthy observation of this remedy that it has a distinct value in limiting the extent of the hot flashes.

DR. HIRAM VINEBERG.—It seems to me that in spite of all our investigations we are still very much in the dark as to the cause of the symptoms that follow removal of the ovaries and uterus. This was very well shown by a large collection of cases, followed up for some time by Mandel and Buerger, which showed that in a large percentage of cases the greatest severity of the menopausal symptoms was found in women over forty, about forty-five or forty-six. This percentage was so marked that they came to the conclusion that it was not always the removal of the glands that caused these disturbances but some disturbance of the nerves of the pelvis. Cases in which the tubes and ovaries had been removed demonstrated this. The patients had gone through the menopause cycle; three or four years had elapsed, and then the uterus had to be removed for some reason. Then there was a recurrence of the menopause syndrome, showing, evidently, that something other than this removal of the ovaries may cause these symptoms.

I am sorry that my experience puts me in a class with Dr. Corscaden, not because I do not use ovarian extract, but because I have had such poor results from its use. In elderly women, past forty, I have found that a combination of bromides and tincture of valerian gives better results than any of the ovarian extracts I have used.

DR. H. R. CHARLTON.—If the hot flash is the most troublesome symptom from which women suffer during the menopause and if ovarian preparations have not been effective in controlling it, there is a drug which does eliminate this discomfort, namely atropine.

In my experience the vasomotor instability, tremor, active sweating and nervous irritability following the surgical menopause have been almost uniformly controlled by this drug. During the last two years in the Out-patient Department of the Woman's Hospital I have utilized it with great satisfaction. From 1:1000 to 1:100 of a grain every four hours is prescribed, and I have yet to see a case which has not been helped; some have been completely relieved.

DR. S. H. GEIST.—Dr. Corscaden's paper interested me particularly because of recent studies that we have been conducting at Mt. Sinai on the effects following operative castration. We did not study the change in psychic attitude of the patient, but took up the question of basal metabolism, weight, blood chemistry and blood pressure. In none of these investigations were we able to determine

any definite or constant change that could be ascribed to the operative removal of the ovaries, except, possibly, the tendency to increase in weight. We found that the blood chemistry and the blood pressure remained within definite normal limits up to a period of three months postoperative.

As to the value of ovarian extracts in the control of the symptoms following castration, I might mention that two or three years ago, working with one of the men in our laboratory, we published a series of experiments dealing with the activity of the various commercial extracts. These extracts we obtained directly from the various manufacturers and were presumed by them to be active. We found that the introduction of these various preparations intravenously in doses even far in excess of those given to human beings, had no effect in preventing the atrophy of the genital organs or breasts. Of course, as we were using rabbits for our experimental purposes, we were not able to determine what the effect of the administration of these drugs would be on the "hot flashes."

The cervix did not atrophy, though I do not believe this was the result of the administration of the various preparations.

DR. J. A. CORSCADEN.—In regard to the question of the age at which we should expect genital changes, I agree thoroughly with Dr. Frank. We have only 12 cases altogether. They run, however, from the age of fifteen up, so that in the younger group we might expect some change in the body characteristics. I suppose that the proper way to investigate this point would be to radiate the ovaries of a 6- or 7- or 8-year-old child, and then watch the development as we do in the regular menstruation experiments.

The question of arthritis, is still to be answered. Cecil's article on the normal menopause looked to me like a discussion of arthritis in elderly ladies, as are Hopkins' articles on hypertension of the menopause. The cases of arthritis occurred in women several years before, several years after, or coincident with the cessation of menstruation.

Whether Dr. Frank—and I am sure he will, from the rapid strides which have been made—gets a substance which can be used as a specific is not as important to me now as it would have been five years ago. I can remember only one woman among these artificial menopause cases who has had such severe hot flashes that I have been compelled to prescribe ovarian extract since 1921, but it is not the hot flash, the physical distress, that causes the terror. The attitude of the normal woman towards the hot flash is one of amusement. She describes it and then laughs about it. When on the other hand, she is worried about the significance or the consequences of the hot flash, it becomes a serious factor. In other words, we have a certain percentage of endocrine causes; we have a certain percentage of psychic causes. If the endocrine disturbance is the match that may set the conflagration going, I think it might be wise to eliminate it if possible, but this whole discussion is on the practical rather than the academic basis, and until such time as Dr. Frank does get this substance, I think we shall have to treat these women as they are. If they suffer from psychic disorders, they should be treated by psychotherapy.

In regard to ovarian extracts I agree with Dr. Frank in principle. Dr. Sharlit in our clinic at Vanderbilt is a chemist and has examined these substances by the ordinary chemical methods, determining the amount of protein, the amount of fat, etc. He finds that some manufacturers are selling what other manufacturers are throwing away.

The question whether or not these ovarian substances, when they do work, work by suggestion or by chemistry I am not prepared to answer. All I know is that a

lot of women have come to the Vanderbilt Clinic suffering from the spontaneous menopause. I religiously keep away from using it in artificial cases, because I believe that the taking of medicine suggests illness. But in the spontaneous cases who already have their discomforts (about 130 odd), large amounts of dry whole ovarian substance have been used. The distribution is such that it seems largely to eliminate suggestion. The hot flashes have been, I think, helped, but I agree with Dr. Frank that this matter of suggestion is so subtle and so difficult to appraise that we must accept the present commercial preparations with caution.

Atropine we have used spasmodically, but because we became so impressed with the psychic factors, we gave up the use of all drugs in these cases.

DR. J. H. TELFAIR reported a case of **Osteogenesis Imperfecta** noted in a baby born at term in a gravida ii, age 20, with a normal first labor and infant.

The present pregnancy was uneventful and the labor lasted about twenty-three hours. The baby was born in poor condition, cry weak, and body disfigured. The bones of the skull were for the most part cartilaginous and very brittle, breaking with extreme ease on slight pressure. Fontanelles and sutures were markedly enlarged and separated. The eyes were slit-like and the features approached the mongoloid type. The vertebrae appeared to be intact but the ribs presented numerous fractures and these likewise involved the long bones of both extremities, resulting in a marked shortening. The baby lived only three hours. The Wassermann test on mother was negative. The autopsy showed characteristic evidences of achondroplasia. The body cavities were essentially normal. A section of the femur showed the shaft to be of almost paper thinness with a large amount of extravasated blood. The epiphyses were normal, although the line was red and congested.

DISCUSSION

DR. HAROLD BAILEY.—I think there is no question that the case presented is typical of the condition. Ballantyne divides the group into several types: *A*, *B*, *C*, and *D*, and this specimen would possibly correspond to type *A*, chondromalacia micromelia or, more simply, achondroplasia. As a matter of fact about a dozen terms have been applied to this condition; the original one was congenital rickets, and certainly this specimen looks as though it might be of that nature.

This radiograph is very interesting, because it shows the peculiar head deformity characteristic of these dwarfs. The head is flattened from above downward and the jaw stands forward, thus giving a curious sinking in the region of the glabella. This head deformity is due to a shortened base of the occipital bone in front of the foramen magnum, so that the opening is far forward in the base of the skull. It is comparable to the formation existing in the bulldog. The skulls of this animal in Stockard's laboratory show plainly that the area in front of the foramen is very much shortened and is perhaps only about one-fourth the length in any other dog.

The deformity is inheritable. It is exceedingly difficult to bring up these dwarfs and they usually die during pregnancy, labor or shortly after birth. When they do come to adult life they are the strong dwarfs that we see in the circus and elsewhere. The condition pertains to teratology rather than to nutritional disturbances of the mother.

MEETING OF JANUARY 12, 1926

THE PRESIDENT, DR. O. PAUL HUMPSTONE, IN THE CHAIR

DR. HERBERT THOMS presented a report of a case of **Fetal Dystocia Due to a Large Cystic Tumor.** (See page 839.)

DR. J. WHITRIDGE WILLIAMS, of Baltimore, read (by invitation) a paper entitled **A Statistical Study of the Incidence of Labor Complicated by Contracted Pelvis in the Obstetrical Service of the Johns Hopkins Hospital.** (See page 735.)

DISCUSSION

DR. JOHN O. POLAK.—This presentation of Dr. Williams must be classed as one of the best contributions we have had on this subject, for the reason that it shows what has been accomplished in lowering the maternal and fetal death rate by the evolution of scientific obstetrics. In looking at the figures as he threw them on the screen, I note that our knowledge of the ways of the black woman is too limited to permit us to discuss that part of his paper. From his statistics we find that the incidence of contracted pelvis in Baltimore in white women is not quite as high as the incidence of contracted pelvis in white women in and about New York. The incidence here is somewhere between 10 and 11 per cent. A type of pelvis that the doctor did not mention is that which we have been seeing so frequently in the last few years since the importation of that large group of war starved Russians. These women have normal external measurements with a high promontory and an increased pelvic inclination and have given us many of our difficulties in infravaginal delivery. Our experience has been practically the same as far as the incidence of the generally contracted pelvis and generally contracted funnel pelvis among white women is concerned.

Another interesting thing in the notation is that his figures are almost identical with ours as far as spontaneous deliveries in minor degrees of contraction in white women are concerned. In three series of cases of 100 each that we studied we found the incidence to be 79, 80 and 81 per cent, respectively, where the labors terminated spontaneously; this practically agrees with his 78 per cent. The interesting point is the very low maternal mortality that he has finally attained by the introduction of the methods that are now in use. Another point that is impressive from the charts is that high forceps has become obsolete, and that there is not among obstetricians today such an operation as high forceps. Furthermore, that instead of doing pubiotomy and version, which at one time seemed to be the trend of Baltimore, there has been a gradual trend towards cesarean section.

This paper would be a dangerous one outside a special society like this, as the doctor makes the statement that he is able, and has shown by the charts that he is able, in a very great proportion of cases practically to foretell exactly what the particular head is going to do in the particular pelvis without estimating the individual expulsive powers of the patient or the moldability of the head. The doctor's statement that his sections have gradually increased to nearly 10 per cent of the operative interventions is entirely in accord with our experience in New York; we are doing less of the test of labor; that prolonged test of labor hour after hour that we were giving our patients years ago is gradually being shortened. As a result we are delivering more living babies and have more living mothers. I am

still of the opinion that perhaps too many uteri are sacrificed in Baltimore, and yet I do not believe that this low cesarean operation is a panacea against the actually infected case. It is in the suspect case that it has its value, not in the actually infected case. When one stops to think for a moment that the involution of the uterus in any case of cesarean section is poorer than it is in the normal case, when one realizes that there is definite migration of the vaginal flora into the uterus after a certain number of hours, one can readily understand how leaving the uterus in these cases that are already potentially infected is fraught with a great deal of danger. Furthermore, there is no question that the convalescence of these cases of hysterectomy is smoother by far than even those in which the woman has a low section and is potentially, but not actually, infected.

DR. HAROLD BAILEY.—Under a plan of treatment—trial labor—with which I might say Dr. Polak disagrees, we have conducted at Bellevue, during the past four years, all our cases of contracted pelvis. As a result it has been necessary to do 47 low flap cesareans and 10 elective cesareans, and there was no loss of life to the mother.

The method by which Dr. Williams separated his cases was very interesting; along similar lines, our figures for New York would be very different, and I think that this is largely owing to the colored women with whom he has to deal. We found that there were very few pelves that we could actually claim as due to rickets, and to our great surprise, at the conclusion of our work, we found that we had almost exactly the same number of generally contracted pelves as flat pelves, and that there were only 10 per cent of all the contracted pelves that were funnel.

DR. J. WHITRIDGE WILLIAMS (closing).—In our series of 3,000 labors in contracted pelves there was a gross maternal mortality of 29, and we noted the interesting fact that 26 of the deaths were in black and only three in white women. But, as there were four times as many contracted pelves in the black women, if no peculiar factors were concerned, we should have had six or eight deaths in the white women, and yet we had only three. What is the explanation for this difference? I cannot tell you, except that I can say in a general way that the colored woman is a poorer risk than the white woman and has less resistance in any physical emergency.

That brings me to the very interesting question as to why it is that we have in America the highest maternal mortality in obstetrics of any civilized country in the world. If you had asked me the reason a year or so ago, I would have said that it was because the medical students in America had received the poorest obstetric training in the world; as until a few years ago there were no obstetric clinics worthy of the name, and that the subject was taught almost entirely didactically. On the other hand, when we take the differing mortality of the two races into consideration, it appears within the range of probability that some other factors may be concerned, and it is conceivable that the American women are less fitted to bear children than those of any other country in the world. Whether this is true or not, I cannot say; as it is a problem that can be solved only after careful statistical study of the results obtained by thoroughly trained obstetricians under the best possible circumstances, and such studies have not yet been made.

A word about radical sections in Baltimore. When we come to analyze them, it will be found that they were almost all performed on colored women who had entered the service in bad shape, or were done directly for purposes of sterilization at a second, third or fourth section.

There is a certain proportion of cases in which I regard it as the operation of choice and where I would not dare do anything else, regardless of the social status

of the patient. I do not think that the low flap operation will ever entirely replace the radical operation, although I think it represents a very considerable advance. Moreover, I believe that the article which Hofbauer has recently written, showing the existence of a peculiar protective mechanism at the base of the broad ligaments, gives a clue as to why the operation proves so satisfactory in what at first glance appear to be unpromising cases. When it was first discussed, I talked to Dr. Halsted about it, and he said he thought there could be no worse operation surgically, as there could be no better way of bringing about a spread of infection than by widely opening up the pelvic connective tissue. Nevertheless, experience has shown that it is a very satisfactory operation in appropriate cases, but we must guard against going to extremes, and we must bear in mind that we have always alternative operations. If you have carefully studied your patient and do a classical cesarean a day or so before the onset of labor the result should be ideal. If, however, you miss the time of election, the low cervical operation comes into play, but if the patient is not seen until infection has occurred, the radical section then becomes the operation of choice.

I think in a teaching institution, such as the one with which I am connected, we must constantly bear in mind that we are teaching inexperienced people who are prone to run away with what we say. Consequently, we must be prepared to justify every operation we do. If many obstetricians had the material that I have, with its large number of colored patients with contracted pelves, I think they would do many times more sections than I have done. I always try to impress upon the students the fact that it requires a great deal more intelligence to decide to let a woman have a spontaneous labor through a contracted pelvis than to do any operation, and I frequently quote Leopold's dictum: "The important thing is to fix the indication; operating is only handiwork—any carpenter can do it." Furthermore, we should always remember that every justifiable obstetric operation represents a failure on the part of Nature, and we must always be on our guard lest it represents a failure of our intelligence as well.

NEW ORLEANS GYNECOLOGICAL AND OBSTETRICAL SOCIETY

MEETING OF JANUARY 14, 1926

DR. W. L. STALLWORTH reported a case of **Full-term Intraligamentous Pregnancy.**

S. N., colored female, age, twenty-four years. Family and previous history irrelevant. Menstrual history without incident. One full-term pregnancy six years before, delivered in country by midwife. Child died of hemorrhage from the umbilical cord on the seventeenth day. First seen in the Touro Maternity Clinic October 28, 1924, with history of having missed her September period. Estimated confinement May 22, 1925. She did not return until February 4, 1925, at which time she presented the appearance of a woman normally four months pregnant. Quickening had occurred just prior to this visit. The Wassermann was weakly positive, and she was therefore given six 3 gm. doses of salvarsan in the G.U. Clinic, the treatment covering some eight weeks. She was kept under observation from February until June, during which time the pregnancy was apparently normal in every way. The urinalyses were negative and the blood pressure varied from 120 to 140 systolic. June 15 there was a sudden attack of severe cramping pains in the lower abdomen, radiating to the back and down the legs. This condition

persisted for two days, during which time she was nauseated and vomited frequently, and seemed very weak. As the pains simulated labor pains she was advised to enter the hospital, but refused to do so, and for some reason she was lost sight of until November 25, 1925, when she was examined in the Touro Clinic. Since June, when she was last seen, she had menstruated regularly every month, duration three to four days, and the flow was slight and without discomfort. Her general health was poor; she was sleeping badly, was very nervous, had frequent dizzy attacks, was short of breath on exertion, and tired very readily. She had lost 30 pounds in weight, her appetite and digestion were poor, her bowels constipated, and there was marked frequency of urination. Abdominal examination showed a firm, round palpable mass, extending as high as the umbilicus, and about the size of a six months pregnancy, on the left of the abdomen and freely movable. A smaller rounded mass, about the size of a large orange, was made out on bimanual examination to the right of the uterus and firmly fixed. A firm rounded mass, apparently the fundus of the uterus, could be made out on deep pressure behind the symphysis. A tentative diagnosis was made of fibroid tumor of the uterus, with the possibility of either an ovarian cyst or a pregnancy. Operation December 4, 1925, at Flint-Goodridge Hospital by Dr. Levy. A midline incision exposed a large, rounded mass, about the size of a football, which proved to be entirely retroperitoneal and within the broad ligament. The left tube extended almost over the vertex of the tumor, but the ovary on this side could not be located. Multiple adhesions were present. The tumor and the left tube were removed without difficulty. A right intraligamentary cyst was also removed, together with the tube of that side, which was involved in the mass. Usual closure, with one large rubber drain. The pathologist reported the condition as a full-term intraligamentous pregnancy.

Dr. W. E. Levy reported a case of **Hemorrhage, Followed by Shock and Acidosis, with Immediate Recovery after the Administration of Glucose and Insulin.**

About a year ago, with Dr. Henry Macheca, he reported in the *New Orleans Medical and Surgical Journal* a case of acidosis following acute hemorrhage. This patient had gone to a midwife to have an abortion done, and as a result was brought into the hospital practically exsanguinated. Her systolic pressure was around 78. She was transfused at once, with good results and considered out of danger. Next morning, however, she was vomiting profusely, and with a markedly sweetish breath. A catheterized specimen of urine showed acetone and diacetic acid. Her condition was obviously very grave. She was given glucose and insulin by hypodermoclysis, without results, and then 600 c.c. of glucose and 20 units of insulin intravenously. Six hours later she was on full diet, and her recovery thereafter was without incident.

Five days ago a similar case of shock occurred following hemorrhage from a retained placenta. After manual extraction, however, the hemorrhage finally ceased. By noon the patient was vomiting profusely, and urinalysis showed both acetone and diacetic acid. In short, acute hemorrhage produces exactly the same chemical changes in the body as does acute starvation. Glucose and insulin by hypodermoclysis failed in this case, as it had in the previous one, but 500 c.c. of glucose with 18 units of insulin intravenously produced exactly the same brilliant results. The vomiting stopped, the patient was put on full diet within a few hours, and her recovery thereafter was smooth.

DR. C. JEFF MILLER read a paper entitled **Glucose and Insulin in the Toxemias of Pregnancy.** (See page 763.)

DISCUSSION

DR. H. E. MILLER.—It has been my impression that the blood-sugar content in eclampties is inclined to run low. A report from Johns Hopkins, by Stander and Duncan, however, states that in a study of some 13 or 14 cases it was found that the blood-sugar content was high, while the CO_2 combining power was low. Bearing this in mind, they have relied for their indications for this line of treatment upon the CO_2 combining power of the blood rather than upon the blood-sugar content, and they contend that a lowered CO_2 combining power may be promptly offset by the use of insulin alone. This is reasonable in view of the fact that if the blood sugar is high, there is no indication for glucose. The paper is purely a preliminary report, but if further investigations bear them out in their first results, their advocacy of insulin alone in such cases will be very convincing. In spite of results which they claim, however, I still believe, particularly in the instance of the average practitioner who is working in the home without laboratory aids, that the method is safer if glucose is used with the insulin. Insulin is a dangerous agent, unless enough glucose is used *with* it.

I might say in general that nothing could persuade me to consider again the old radical treatment for eclampsia. I cannot give you exact figures, but I know that in the last few months I have seen a relatively large number of women admitted to our service at Charity in convulsions or coma. We try to keep them absolutely quiet, in a darkened room, we give them opiates, not systematically according to the Stroganoff method, but according to the individual indications of each case, we bleed them where the blood pressure is persistently high or where there have been more than two convulsions, and we give them glucose and insulin by intravenous infusion. There is no sweating, no purging, and certainly no attempt at forced delivery. I do not recollect a single instance in which marked improvement has not followed this course of treatment. We are also getting away from the immediate induction of labor, even by the improved conservative methods, for this reason, if no other: if the patient is in such a condition that she is going to need morphia or opiates for eighteen or twenty-four hours, induction will be difficult if not impossible, and therefore time is really saved by waiting, particularly in view of the patient's improved physical condition.

DR. WALTER E. LEVY.—We have definitely proved that in the preeclamptic toxemias, and also in eclampsia, both the blood-sugar content and the CO_2 combining power are lowered. My report is based upon studies in some 50 cases, of which these are illustrations: blood sugar, 60.6, CO_2 combining power, 43; 76.8 with 38.3; 54.8 with 39.3; 57.1 with 37.4; 83.3 with 37.4. In these studies the blood sugar runs from 52 up, the highest being about 84, while the CO_2 combining power runs from 32.5 up. In looking up the literature of blood sugar, I found the report of a series of experiments by Mann of the Mayo Clinic. He took the livers out of a number of dogs, and in every instance he found that before death the blood sugar was practically cut in half, while the glycogen of the muscle was also depleted some 50 per cent. Now, to reason by analogy, if in a hepatectomized dog the blood sugar is low, and death ultimately ensues with convulsions and coma, why does not the same thing happen when we have a chemical destruction of the liver, as in eclampsia, which produces true hepatic destruction? Frank describes the process as a central necrosis, the debris being composed chiefly of liver cells, and I can see no difference between the surgical removal of a dog's liver and the chemical destruction of a woman's liver by process of disease. In both instances the fats are incompletely burned, acetone and diacetic acid develop, and a state of

acetonuria results. I think Dr. Miller is entirely correct in his advocacy of glucose and insulin in these toxemias; the liver function, as a result, returns, and the glucose seems to stay further liver destruction. Administration by hypodermoclysis gives no results; I have proved this in a series of cases where immediate results followed administration by infusion, with the insulin given subcutaneously.

If these new investigations of mine are correct, our diet in toxemias in the past has been wrong. We tell our patients not to eat meat or eggs, advocating fats and sugars. Fats should be eliminated from the diet, because they are incompletely burned, and proteins in moderation should be permitted. Heretofore we have given our patients lactose to build up their carbohydrate reserve, but Mann in his investigations found that it had no effect at all upon dogs. I cannot agree with the report from Hopkins in the December issue of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY, to which Dr. Miller has referred. In my opinion you cannot have an acidosis in the face of a high blood sugar. I might add that in doing this work I ran across a German article which stated that acetone bodies could be found in the blood of the normal pregnant woman, showing the tendency to an already existing acidosis.

DR. J. S. HEBERT.—Dr. Paul Titus, of Pittsburgh, in the August, 1925, issue of the *Journal of the American Medical Association* states that glucose not only supplies the necessary element for a liver which is defective functionally, but actually regenerates liver cells. Certainly in any discussion of this line of treatment that point should be emphasized.

DR. T. B. SELLERS.—I have used glucose alone, as well as glucose and insulin, in the treatment of the early toxemias of pregnancy particularly, and I think there is no question but that the combined treatment gives better results than the glucose alone. Thalhimer believes that in pregnancy there is a fundamental change in the carbohydrate metabolism, and not merely a carbohydrate deficiency, as Titus claims, and I am inclined, from my experience, to believe that Thalhimer is correct. Three years ago I reported before the Orleans Parish Medical Society a case of pernicious vomiting of pregnancy in which glucose alone was used. After the administration of the glucose the urinalysis showed 4 per cent of suger. Her toxemia increased, however, and she died three days later. I am convinced that insulin would have given her a much better chance for recovery.

DR. MILLER (closing).—As a general thing I should certainly urge the use of insulin whenever it seems indicated, even without definite laboratory data, with the addition of glucose as a preparation for the hypoglycemia likely to follow. With prompt service from the department of biochemistry, and the liver function tests now possible, we shall have great assistance in reaching scientific conclusions as to the indications for treatment in these cases. Now we have to rely upon the clinical condition of the patient. Has the liver reached its limit of function? How seriously is it embarrassed? What are the limits of safety of the CO_2 combining power of the blood, and how are we to know when these limits have been reached? Such questions can only be answered in the laboratory, and until they are answered promptly our treatment must be given on the gross clinical indications and must remain correspondingly empirical.

DR. PHILIPS J. CARTER read a paper entitled **The Vomiting of Pregnancy, Its Causation and Its Treatment.** (See page 828.)

DISCUSSION

DR. J. S. HEBERT.—I noted that Dr. Carter in his classification of types of vomiting included the reflex type. Dr. Williams in his older textbooks gave the three classifications of neurotic, reflex and toxemic vomiting, but in his recently revised

edition he has dropped the reflex classification. We all have had our particular way of treating this distressing condition, but we are agreed, I think, that the specific method is still to be discovered. In the last few years I have used the plan advocated by Titus of Pittsburgh. He classes his cases as mild, moderately severe and pernicious, and he has three types of treatment based on this classification. In the mild cases he seeks to win the confidence of the patient, encouraging her to believe that the condition is a temporary one which will soon disappear, and he prescribes correspondingly simple measures. Liquid food is taken every two hours, or possibly some solid food with a highly concentrated carbohydrate content. In addition he suggests a solution of 10 per cent glucose and two per cent bicarbonate of soda, to be taken in 2 oz. doses every two hours. He stresses particularly the regularity of both food and medication. The moderately severe cases are treated along the same general lines, with the addition of Murphy drips or hypodermoclysis as indicated, and 10 grains of chloral and 30 grains of potassium bromide twice daily. The pernicious cases are treated vigorously at once, and the administration of glucose intravenously seems to control this type in his hands.

DR. P. B. SALATICH.—I would like to substantiate what Dr. Carter has emphasized, that in using ovarian extract for this condition, ordinarily we do not give enough of it. If one ampule a day gives no results, I give the same dosage two or three times a day, and I have occasionally given two or three ampules at a dose. I can recall only one instance in which I failed to stop the vomiting; in that case the patient would not follow my advise in any respect, and I finally refused to continue treating her. Glucose, with or without insulin, has, since its introduction, made the handling of the serious cases of pernicious vomiting a much simpler matter, but in the average case I think you will find that ovarian extract does the work if you will saturate your patient with it.

DR. JOHN F. DICKS.—I have used both corpus luteum and ovarian extracts quite extensively in treating the vomiting of pregnancy, but my results have not been striking, possibly because my dosage was too small. I have given as much as 1 c.c. every day for twelve or fifteen days, and occasionally a patient has been benefited, but as a general thing my results have been disappointing. The point which Dr. Carter emphasizes, that the patient should be saturated, may have something to it. The cases he reports are certainly remarkable, and if saturation is responsible for them, our small dosage may explain our failures.

DR. T. B. SELLERS.—In 1922 I reported before the Orleans Parish Medical Society a series of cases of vomiting of pregnancy which had been treated by ovarian extract or lutein, intravenously, intramuscularly or by mouth for from fifteen to twenty-eight days; my results were so poor that I did not feel justified in continuing the treatment. Dr. Carter's advocacy of saturating the patient with ovarian extract may explain my failures. I would advise the use of glucose and insulin in all toxic cases; since I began to use this method I have not had a mortality, nor have I had to empty the uterus. The treatment, however, should be instituted early, before the pronounced symptoms of toxemia develop.

DR. A. H. GLADDEN JR.—Can you compare a series of cases treated by ovarian extract alone with a series treated by the extract plus the luminal-sodium? And how much of your good results do you attribute to the latter agent?

DR. CARTER. (closing).—I have been working on this subject of the vomiting of pregnancy since 1915. I began, as I have said, with the tablet form of ovarian substance, because in those days the extract was not available. After the expenditure of considerable time and effort I finally persuaded a local firm to put up the fluid form, and since 1918 I have used that preparation. As a matter of fact, I

was so thoroughly convinced that this would be the most effective form that I finally told the pharmaceutic houses I would quit using the preparation altogether if I could not get the form I wished. In the paper I read on this subject at Alexandria I reported 40 cases with 100 per cent good results. In a few cases I have used corpus luteum in ampule form, but the percentage of cures has not been encouraging. Glucose and insulin should be used immediately in a serious case. In the last case I reported, in which abortion was eventually done, I used it first by hypodermoclysis, and twice intravenously, with no results at all, and I believe that the condition was an incipient, recurrent acute yellow atrophy of the liver. The urinary findings were characteristic, she began to turn quite yellow, and I did not feel that further delay was justifiable.

I have not had such good results with corpus luteum as with the whole ovary. If corpus luteum gives such results as Hirst in particular claims for it, then we may reasonably expect the whole ovary to give better results, and it was with that idea in mind that I began this form of treatment. The secret of the method is saturation. It must be administered regularly every day, without skipping, and in bad cases I have given 2 or 3 ampules in a day. In view of the good results I have had with this mode of treatment, I would say that the theory of the ovarian hormone is a reasonable one.

In answer to Dr. Gladden, I have not checked two series of cases, one with ovarian extract alone, and one with the extract plus luminal, but my theory is this: if the case does not respond to ovarian extract, which is directed, so to speak, at the factor concerned in the pregnancy, then there is evidently a digestive factor present, or a neurosis, and luminal in either condition exerts a sedative action. After the vomiting is checked by the action of the ovarian extract I continue the luminal for its sedative effect. I am not advocating this treatment as the specific for this condition, but until we know the underlying cause of the vomiting and can treat that cause, we are justified in using any method which gives results, and in my hands the treatment I have outlined has been very satisfactory.

The final installment of the Transactions of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons will appear in a subsequent issue.

Item

American Gynecological Society

At the last meeting of the American Gynecological Society, the following officers were elected:

President—Dr. Arthur H. Curtis, of Chicago, Ill.
First Vice-President—Dr. Frank W. Lynch, of San Francisco, Calif.
Second Vice-President—Dr. James R. Goodall, of Montreal, Canada.
Treasurer—Dr. Fred L. Adair, of Minneapolis, Minn.
Secretary—Dr. Floyd E. Keene, of Philadelphia, Pa.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

The Obstetric Literature of 1925

BY J. P. GREENHILL, B.S., M.D., CHICAGO

(Continued from May Issue)

LABOR

THE preparation of patients for delivery varies considerably in different institutions. Siddall[86] describes the technic used at the Henry Ford Hospital. After clipping the pubic and vulvar hairs, a diluted tincture of iodine solution (2 per cent) is applied to the vulva, perineum, lower abdomen, and inner sides of the thighs. Much better results are obtained with this preparation than with the usual scrub and flush preparation. Mayes[87] made a study of cases to compare mercurochrome and iodine as antiseptics in the preparation of patients for labor and came to the conclusion that mercurochrome is preferable to iodine.

The usual scrub and flush preparation gives very good results if properly carried out, but unfortunately not all nurses know how. A good procedure is to have the patient shaved and given the usual scrub and flush preparation when she starts in labor and an application of iodine or mercurochrome just before the actual delivery.

Analgesia and Anesthesia.—The matter of analgesia in obstetrics always requires consideration because of its importance. Undoubtedly the greatest advance in recent years has been the method suggested in 1923 by Gwathmey (morphine-magnesium sulphate injections and colonic ether instillations). Nearly all who use this method report very good results. Davis[88] gives a very clear and comprehensive synopsis of the method and emphasizes certain important precautions. Harrar[89] is convinced that the Gwathmey procedure is the safest and most effective method for the relief of labor pains. Others (Gwathmey and Hooper[90]) also report excellent results, but there are a few dissenters. Lörincz,[91] of Hungary, believes that the method is not harmless. However, Gwathmey's answer[92] to this is that at the New York Lying-In Hospital where over 200 patients receive this form of analgesia every month, no harm has been seen in either the mother or child. Another dissenting opinion is that of Beckman[93] who performed experiments on dogs to test the alleged synergism of magnesium sulphate and morphine and concluded that there is no synergism in dogs and that no satisfactory proof to show this synergism in man has been presented. Gwathmey[94] answers this by submitting evidence to show that synergism does occur in man and that

it has been established in the albino rat, rabbit, and dog also. In spite of this, Beckman[95] does not accept the evidence as proof of synergism.

In 135 cases studied by Fuchs,[96] twilight sleep failed in nearly 4 per cent, 18 per cent of the babies were born oligopneic, 6 per cent were apneic and 3.7 per cent were both apneic and asphyxiated. Labor lasted longer than usual. Carter[97] substitutes pantopon for morphine to eliminate headache, nausea, and vomiting.

King[98] points out the advantage of ethylene-oxygen over ether and nitrous oxide as an anesthetic in obstetrics. He has not noticed any undue tendency to postpartum hemorrhage, but this complication has been seen by others, including the reviewer. Not only is the blood of the mother changed but also that of the infant as recently proved by Sanford.[99] The danger of explosion from static electricity need not be feared if the patient and machine are grounded, if a water-washing inhalant machine is used, and if the rubber parts are coated with Zeppelin paint.

Three cases of delayed chloroform poisoning are reported by Royston[100] who, in spite of these cases, still feels chloroform is a safe anesthetic in obstetrics. Patients who have long, exhausting labors and who take little food during this time, should not be given chloroform. The dangers of chloroform have from time to time been emphasized; but despite this, the drug is still popular in obstetrics though very seldom used in general surgery. Chloroform should never be used for a long period of time and, if used at all, calls for a diet rich in carbohydrates and milk and restricted in fats, before the anesthetic is given (Stander[101]).

Febres[102] advocates injection of the Frankenhaüser ganglia to produce anesthesia in labor. Rucker[103] feels that novocaine injected sacrally produces marked relaxation of the perineum and the external os, with anesthesia to pain and also largely to pressure. He believes it is an excellent procedure for operative obstetrics, but its value for spontaneous delivery is dubious.

There is no doubt that intraspinal anesthesia is dangerous, especially for pregnant women (Krönig), and while epidural anesthesia is apparently harmless, occasional bad results have occurred. Where a spontaneous delivery is anticipated, neither intraspinal nor epidural anesthesia should be used. For forceps delivery where a general anesthetic cannot be used, direct infiltration (novocaine) anesthesia, with or without morphine, gives good results.

Complications.—In order to estimate the true value of the passage of meconium as a sign of fetal distress, Schulze[104] studied 5534 obstetric cases and found that meconium appeared in the amniotic fluid in 3 per cent. The author concludes that the passage of meconium during labor is in the large majority of cases entirely independent of fetal asphyxia. In cases associated with asphyxia, changes in the fetal heart tones are invariably present, and the latter, therefore, should be the sole guide as to the necessity for operative interference. Adams,[105] who studied the effect of a short umbilical cord on labor, believes that in by far the great majority of cases, a short cord causes neither dystocia nor danger to the fetus, and although this condition exists as a potentially dangerous complication, it only rarely necessitates operative interference.

Very little has been written this year on the use of pituitrin in labor. However, Laurentie[106] reports a death due to pituitary extract,

and Rucker[107] describes a case of incomplete tetanus (demonstrated by a hysterogram) which was produced by so small a dose of pituitrin that no action was observed clinically. Nowadays it should not be necessary to emphasize the dangers of pituitary preparations in the first and especially the second stage of labor.

Operative Obstetrics.—In a discussion on birth injuries, Stern[108] calls attention to the importance of spontaneous nystagmus as a sign of cerebral damage and advocates more frequent use of operative procedures for the sake of the baby. He advises that forceps be applied after the fetal head has remained on the perineum for three hours. Rittershaus[109] tells us that at the Frieburg Clinic the indications for forceps at present are uterine atony, a second stage of four hours, threatened infection, fever, acute infection, heart failure, and a fetal heart rate of less than 100 during a pause between uterine contractions. Since instituting the four-hour rule for the second stage, the number of forceps operations has increased, but the fetal mortality has decreased. There was no increase in maternal mortality or morbidity.

This is gratifying information because of the previous ultraconservatism of this clinic. There is no doubt that the dangers of the second stage are greater than those of the first. This calls for careful control of the fetal heart tones during the second stage and interference when the heart tones indicate danger. Since delay in expulsion of the child after a few hours endangers the child, it is advisable for the expert to apply forceps soon after complete dilatation of the cervix provided the head is on the pelvic floor and the occiput is anterior.

Both Jarcho[110] and Scadron[111] extol the Kielland forceps. Two years ago the reviewer[112] abstracted the literature on the subject and indicated that the large majority of obstetricians who used this forceps felt the instrument was a definite advance in obstetrics. The reviewer has had no cause to change the opinion expressed in the Collective Review which was summarized as follows: "I feel that the Kielland forceps are distinctly helpful when the head is above the spines of ischia and also when the head is engaged, but where the occiput is not in an anterior position and cannot be brought into an anterior position manually. Where the head is engaged and the occiput is anterior or can be rotated anteriorly with the hand, I believe better results can be obtained with the Simpson forceps." More important than the type of forceps is the man performing the operation.

For occiput posterior positions B. C. Hirst[113] advocates the Scanzoni maneuver, while Bill[114] recommends a modification of this maneuver. The reviewer favors rotation with the hand rather than with forceps, because by means of the hand not only may rotation be accomplished easily in most cases, but it is also possible to correct a deflection attitude and asynclitism. Whenever rotation of the head is undertaken, whether manually or instrumentally, it is advisable to lubricate the vagina liberally with green soap.

In a series of 1000 deliveries, Johnson[115] performed 445 podalic versions by Potter's method. The fetal mortality was 2.4 per cent. Johnson regards the Potter version as a most valuable method of delivery when done on the proper cases, at the right time, and by one who knows how. While agreeing that the Potter way of performing version and extraction is probably the best, because it combines all

the good points previously suggested for the performance of this operation, it is not hard to understand why the vast majority of obstetricians refuse to terminate most labors by a major operation. Nevertheless, Potter has made a definite contribution in reviving the operation of version and extraction.

During the past year much has been written on the low or cervical cesarean section. DeLee[116] reports 330 of these operations performed by various operators at the Chicago Lying-In Hospital. There were only 2 maternal deaths, one from peritonitis and the other from pneumonia. During the same period of time 136 classic cesarean sections were done by the same operators with 7 maternal deaths. DeLee claims the following points of superiority for the cervical operation (laparotrachelotomy) over the classic: a decidedly lower mortality, a decidedly lower primary morbidity, a greater guarantee against rupture of the uterus in subsequent pregnancy and labor, a greater guarantee against intraperitoneal adhesions, fewer hernias, the permissibility to extend the indication for abdominal delivery to cases of neglected labor, even when infection is suspected, and the possibility of giving the parturient a real test of labor before concluding that abdominal delivery is necessary. In another paper DeLee[117] points out the advantages of using local (infiltration) anesthesia for the cervical cesarean section. The method is described in detail and the results in 67 cases are analyzed. DeLee is of the opinion that local anesthesia is not only possible but should be the method of choice for all cesarean sections including the cervical. The dangers of acidosis and pneumonia are avoided and the postoperative recovery is smoother and quicker than that following general anesthesia. In heart, respiratory, kidney and liver cases it is particularly valuable, indeed almost indispensable.

Armitage[118] reports 31 cervical cesarean sections with one death, while among 21 classic cesarean sections he lost 5 mothers. There are very few articles in the French literature on the cervical cesarean section. Fleurent[119] reports 10 of these operations, of which 6 were "unclean." In two of the latter, forceps had been attempted before operation. One mother died (in the "unclean" series). In discussing this paper Hamm[120] mentioned that he had performed 18 of these operations with excellent results. In 16 of them he had used local anesthesia.

Attention is again called by Greenhill[121] to a special group of women, most of whom require cesarean section. The typical patient in this group is a heavy-set woman with masculine and hyperpituitary characteristics. Her external measurements are usually large, but the available space in the pelvis is somewhat smaller than normal and her extremities are short. There may be a family history of dystocia and the patient's own history may indicate abnormalities in the sex life. The patient usually goes beyond term, and the fetal head, which is hard and in an occiput posterior position, remains high even after many hours of labor. The membranes often rupture before the onset of pains and the latter are usually irregular. When delivery is attempted from below, the result is often disastrous to the child and injurious to the mother. In view of this danger it is advisable to do a cesarean section to deliver a living and uninjured child. Since many of these cases are not recognized until after a long test of labor,

it is hazardous to perform a classic cesarean section; hence the cervical operation should be done.

A study of three scars from human uteri and uterine scars of pregnant guinea pigs leads Schwartz and Paddock[122] to conclude that the most important thing in the technic of elective cesarean section is to obtain good wound approximation with a minimum of suturing and with as little tension on the sutures as possible.

Schmidt[123] reports 11 hebosteotomies with one maternal and two fetal deaths, and 23 symphyseotomies with 3 maternal and 3 fetal deaths. From a review of the literature on hebosteotomy, Le Lorier[124] comes to the conclusion that the subcutaneous operation is superior to the open operations. The results are the same for both subcutaneous hebosteotomy and subcutaneous symphyseotomy. From a similar review of the literature, Rossier[125] concludes that the following are the proper indications for pelviotomy (symphyseotomy and hebosteotomy): (1) contracted pelvis; (2) excessive size of the baby with nonengagement of the head or lack of progress in a normal pelvis; (3) slow dilatation of the cervix after rupture of the membranes, no progress in dilatation for three hours, or when after dilatation the head does not progress after two hours of good pains; (4) persistent defective cephalic presentation, such as face presentation and asynclitism.

Were obstetricians to perform pelviotomy for the above indications, the number of such operations would be enormous and the results dubious. In this country very few pubiotomies are performed because most obstetricians prefer to do cesarean sections. When a patient has been in labor a long time, especially after rupture of the membranes and vaginal examinations, the cervical cesarean section should be done because the classic operation is fraught with danger in these cases. Where there is frank infection, a subcutaneous pelviotomy may be performed; but a Porro operation or a craniotomy may be preferable, depending upon the conditions present.

Uterine Hemorrhage.—A new diagnostic sign of placental separation is described by Klein.[126] The sign is elicited by asking the patient to press downward as if she were defecating. If the umbilical cord descends and remains at its point of descent after the woman ceases to bear down, the placenta has separated. If the cord moves back into the vagina when pressure is stopped, the placenta is still attached. This procedure is somewhat similar to the method described a few years ago by Baer,[127] who utilizes increased abdominal pressure to expel the separated placenta.

In a very elaborate monograph prepared for the German Gynecological Congress held in Vienna last June, Stoeckel[128] reviews not only the literature regarding postpartum hemorrhage but also analyzes 971,487 labor cases about which he gained information through questionnaires. The monograph is divided into two parts, that which concerns itself with the normal and that which relates to the pathologic third stage of labor. Stoeckel regards the third stage as normal when the placenta is separated by uterine activity alone and is expressed by abdominal pressure or by the Credé maneuver. The upper limit of blood loss is 500 c.c. Bleeding in the third stage is physiologic and a bloodless course is just as abnormal as a hemorrhage. The most certain signs of complete separation of the placenta are changes in position and shape of the uterus. If the placenta does not separate in three to four hours it should be removed manually. Retention of the

separated placenta is due to mechanical or medicinal maltreatment of the uterus and to tubal corner placentas. Among the 971,487 labors, 582 women died of hemorrhage (0.6 per cent) but only 0.28 per cent died of pure atony (hypotony is a better term). The others died of rupture of the uterus, placenta previa, etc. In the prophylaxis of atonic bleeding, hypophyseal preparations give unfavorable results (0.7 per cent hemorrhages). Massage is the best uterine stimulant. Manual removal of the placenta should be done earlier and more frequently than it has been done. The uterus should be investigated immediately for missing pieces of placenta; because the longer one waits the worse the prognosis. The mortality of those who employ uterovaginal tamponade for atony of the uterus is twice as great as the mortality of those who do not use this procedure.

There are a number of statements in Stoeckel's monograph which are at variance with the experience of some obstetricians. For example, the last sentence in the above abstract. It is certainly not universal to have such bad results with uterovaginal tamponade unless the latter is not properly performed. In packing a uterus one must take every precaution to maintain asepsis for this is of the utmost importance. Many a man loses his head when he sees profuse bleeding and in his haste to check the bleeding disregards asepsis. Furthermore, the uterovaginal tract must be packed evenly and tightly to obtain the proper result. Exception may also be taken to the statement that hypophyseal preparations give unfavorable results in atonic bleeding. In many institutions where pituitrin is given after the delivery of the child, there has been a very definite decrease in the incidence of postpartum hemorrhage and manual removal of the placenta. In a clean hospital, particularly if it is a maternity and not a general hospital, an obstetrician need not wait three or four hours to remove a placenta manually; but strict asepsis must be maintained. However, in the home or in a hospital of questionable cleanliness, where patients are delivered in rooms in which "pus cases" are also treated, manual removal of the placenta is a most serious operation because of the great danger of infection.

The retention of pieces of placenta in utero late in the puerperium is a most dangerous complication. Among 41 such cases at the Prague Clinic, the mortality was 27 per cent. Because of the seriousness of placental remains, Wagner[129] favors the Mojon-Gabaston method of turgescence of the placenta. In two-thirds of the cases, where pieces of the placenta were retained, there was no bleeding to indicate retention. Since even inspection of the placenta does not always reveal that pieces are missing, the author advocates Küster's milk test (injection of milk into the umbilical vein after delivery of the placenta). If there is any suspicion that placental tissue remains in the uterus, the latter must be explored without delay; for the retention of placental tissue is far more dangerous than invasion of a recently emptied uterus. Pankow[130] is of the same opinion.

The reviewer agrees with both authors but would like to emphasize that undue manipulation of the uterus before the placenta has separated, as well as the Credé maneuver, may cause not only severe hemorrhage but also retention of pieces of the placenta. Still greater damage can also be done, as evidenced by the experience of Kutter,[131] who reports 3 cases of rupture of the uterus. One of these was due to

manual removal of the placenta, but the other two were due to forcible Credé expression.

A paper containing very sound advice regarding the treatment of hemorrhage in the last trimester of pregnancy was written by Burgess.[132] This article is especially valuable for the general practitioner.

The treatment of placenta previa must of necessity vary with certain factors, such as the environment, the size of the baby, the amount of hemorrhage, the amount of cervical dilatation, and the skill of the obstetrician. In a study of 254 cases of placenta previa, Watson and Miller[133] found that the best results for mother and child were obtained by the two extreme methods of treatment, namely, (1) conservative—no interference or only a minimum of it in the form of rupture of the membranes or using a vaginal pack, and (2) radical—in the form of cesarean section. It was in the cases treated by intermediate methods that the high mortality occurred. The authors feel that the scope of cesarean section might legitimately be increased in order to diminish the present high maternal and fetal mortality. C. J. Miller,[134] on the other hand, believes the argument that the fetal mortality in placenta previa will be markedly diminished by cesarean section is fallacious and, since this is so, any additional maternal risk for the sake of the child is unwarranted.

C. J. Miller's statement should not go unchallenged. At the Chicago Lying-In Hospital, 23 cases of placenta previa were delivered by cesarean section. All the babies were born alive and left the hospital in good condition except two. One of the latter was an anencephalic monster and the other was macerated. Both of these conditions could have been determined before operation by means of the x-ray as emphasized by Greenhill[135] a few years ago, when he pointed out the association of fetal monsters with placenta previa.

Ballhorn[136] found that 20 per cent of all patients who were tamponned at home, developed puerperal fever and in half of the cases the tampon was ineffectual in stopping hemorrhage. He found that cesarean section gave the best results. Houël and Jahier[137] treated 3 cases of placenta previa by the Simpson method, which consists in freeing the entire placenta from the uterine wall before delivering the child. One patient died.

Williams[138] gives a critical analysis of his experience with premature separation of the normally implanted placenta. Among 9000 cases at the Johns Hopkins Hospital, premature separation of the placenta occurred 57 times, while placenta previa occurred 64 times. The last 40 cases of premature separation of the placenta are analyzed, and of these, one-quarter were under twenty years of age which is in contrast to placenta previa. Twenty-three of the 40 cases required operative assistance; among these were 10 cesarean sections, in all of which the uterus at the time of operation presented the characteristic purplish-bluish metallic discoloration of its walls—the so-called uteroplacental apoplexy. Histologic examination showed intramuscular hemorrhage more pronounced in the outer layer of the uterine wall, hence the blood could not have been forced into the muscularis as a result of increased intrauterine tension. There is nothing in Williams' material to support the traumatic origin of premature separation of the placenta. No case of cesarean section showed marked twisting on its vertical axis. Williams says that, as far as he is aware, a case report of Polak, in which the cesarean section in-

cision lay near the insertion of one round ligament, is the only evidence adduced to support Morse's contention that torsion of the uterus can produce hemorrhagic lesions. Recently Greenhill[139] reported a case of uteroplacental apoplexy in which a Porro operation was performed. The uterine incision which had been made in the lower uterine segment and lower part of the fundus was alongside of the left broad ligament; but the dextrorotation did not seem to have any connection with the pathologic condition.

The majority of authors feel that toxemia of some kind is responsible for most cases of premature separation of the placenta; but 15 of Williams' 37 patients who survived had no albuminuria at all during the puerperium. The exact etiology, according to Williams, is still unknown. If the cervix is fully dilated or dilatable, Williams advises that delivery should be promptly effected by the most conservative means. If the cervix is not fully dilated, the bleeding profuse or concealed, and the patient shows signs of excessive loss of blood, cesarean section should be done. Supravaginal operation is necessary only if the uterus remains flabby. Phaneuf[140] reports two cases of uteroplacental apoplexy and reviews the literature.

PUERPERIUM

A number of papers appeared on the etiology and treatment of puerperal sepsis. Bigger and Fitzgibbon[141] found that while certain cases of puerperal sepsis are due to staphylococci, B. coli and other bacteria, the majority are attributable to streptococci. The authors found streptococci in the vaginas of 68 per cent of the cases examined, hence these bacteria may be regarded as belonging to the normal flora. The commonest form of puerperal sepsis, that due to hemolytic streptococci, is caused by exogenous infection. Sepsis due to nonhemolytic streptococci is an endogenous infection of which the cause is the streptococcus of the vagina plus some unknown factor.

DeLee[142] reports a case of puerperal peritonitis treated by lymphaticostomy. Although the patient died, there was a definite improvement after the operation and DeLee feels that the amount of drainage which occurred indicates there is a future for this operation in cases of peritonitis. Descarpentries[143] praises highly the reinjection of the patient's own hemolyzed blood for cases of puerperal sepsis.

Although there have been some good results in the treatment of puerperal septicemia by means of the intravenous use of mercurochrome, Piper[144] says that the results in general are most discouraging. He feels that there is some unknown factor which must be determined before we can successfully eradicate blood stream infection.

It has been shown experimentally and clinically that acroflavin, gentian violet, and mercurochrome in concentrations compatible with life, irritate the liver, kidney and heart and injure these organs. On the other hand, in the treatment of puerperal infection, Polak[145] is of the opinion that blood transfusions in quantities of from 200 to 300 c.c. typed and matched, are indicated.

The experience of Piper and Polak is the experience of most obstetricians, for intravenous medication in puerperal sepsis has not only done practically no good but has in several instances caused harm. The less that is done to a patient with puerperal sepsis, the better her

chances for recovery. The important thing is to build up the patient's resistance by fresh air, sunlight (including the use of quartz and other lamps), appetizing nourishment, tonics, etc. If pus is present, drainage should be secured. The uterus should not be invaded unless there is hemorrhage. Blood transfusion is a very valuable aid but should be used with caution.

Ott[146] recommends that the vagina be disinfected in all labor cases. Usually this is a dangerous procedure; but in long labors, especially where there is intrapartum fever, it may help to flush the vagina with mercurochrome a number of times during labor.

NEWBORN

By improving and changing somewhat the Abderhalden pregnancy reaction, Lüttge and v. Mertz[147] last year sought to determine the sex of the fetus in utero. They found that testis extract produced a reaction in the blood of women who gave birth to boys. Schmidt-Ott[148] verified this work and was able to determine the sex correctly before birth in 90 per cent of the cases.

While the older authors believe that nearly every newborn developed jaundice, it is now known that the number of babies showing icterus has considerably diminished, due to the modern conception of the principles of asepsis and the better care of the newborn. Hilgenberg[149] found that, at the Marburg Clinic, 68 per cent of the newborn developed icterus. Operative deliveries were found to favor the occurrence of jaundice.

The last statement is true but does not apply to cesarean sections, for not many babies born by cesarean section have jaundice, unless the operation is done after a long labor. Babies born after long hard labors show jaundice, regardless of whether delivery was spontaneous or operative.

In an editorial[150] on the production of congenital and hereditary malformations through irradiation, the conclusion is reached that the actual danger of developmental defects from irradiation of child-bearing women is not so great as to represent a contraindication to this form of therapy for conditions in which it is seriously needed; but the potential danger is real enough to discourage irradiation when the indications for its use are not urgent or when the prospects of actual benefit are at all doubtful.

McCandlish,[151] who studied an epidemic of 224 cases of impetigo in the newborn, believes that this condition and exfoliative dermatitis are the same disease and are due to the Staphylococcus aureus. This infectious disease is also contagious and has a self-limiting course with a tendency toward spontaneous recovery. Mellon, Caldwell, and Winans[152] attempt to show that the breast milk of certain mothers may contain large numbers of Staphylococcus aureus, thus constituting a possible source of infection for the newborn. The authors believe that the evidence submitted is at least presumptive that certain outbreaks of pemphigus neonatorum are traceable to an initial case infected by the mother's milk. Cannot the child infect the mother?

Grulee[153] feels that the best treatment for intracranial hemorrhage is absolute quiet and rest because the damage is done before any measures of relief can be of value. Sharpe and Maclaire,[154] however,

believe that early lumbar puncture, as both a diagnostic and therapeutic measure, is of great benefit.

In a collective review, Ehrenfest[155] analyzes the new information gained during the last three years concerning the causation and sequelae of intracranial birth lesions. He emphasizes that approximately one-half of all infants, either stillborn or dying within the first few days of life, at autopsy reveal some sort of laceration of the dura mater or more particularly the tentorium. Hence, we should consider with greater concern every artificial method of hastening the expulsion of the fetus, especially if we know it to be premature. Haste of any kind may imply a risk to the child far greater than the possible benefit the quicker delivery is expected to offer to it. Berberich[156] experimentally produced typical cephalhematomas and intracranial hemorrhages by applying a suction apparatus to the head of newborn animals. The brain changes were exactly like those found by Schwartz[157] in 65 per cent of newborn babies and offer more confirmation of the injury which occurs during labor, normal as well as pathologic.

Among 81 cases of pyelitis in pregnant women studied by Naujoks,[158] one-third of the babies were lost. The causes of fetal death may be the production of uterine contractions by the toxins and fever or direct injury to the fetus in utero, by bacteria and toxins.

From a study of 450 autopsies on newborn babies, Adair[159] concludes that in order to reduce the loss of fetal life we must furnish proper prenatal care, must conduct labor to lessen fetal trauma, and must so conduct the postnatal stage that the newborn infant is subjected to a minimum of exposure and the least possibility of infection. An analysis of 500 autopsies on stillborn and newborn babies by Johnson and Meyer[160] showed that 19.4 per cent had pneumonia and that 13.6 per cent were probably infected before birth. The great majority of these cases were probably due to aspiration of infected amniotic fluid following infection of the amniotic sac after premature rupture of the membranes. The danger of this infection was disproportionately greater for the child than for the mother.

During the last three years a number of articles have appeared hailing lobelin as a sovereign remedy for the treatment of fetal asphyxia. However, Jacobi and Walbaum[161] and also Mennet[162] show definitely that this drug is dangerous at times.

Plass and Matthews[163] found that the amino acid nitrogen is constantly higher in the fetal whole blood and plasma than in the maternal samples. The amino acids which are probably necessary for the synthesis of proteins in the fetal organism thus behave as do the other constituents which are essential to growth (calcium and inorganic phosphates). The fetal whole blood and plasma were also found to contain more total nonprotein nitrogen than the maternal specimens. The urea and uric acid in the maternal and fetal blood were equal.

PLACENTA

Wehefritz[164] studied the proteins of the placenta in various stages of development and found that the protein molecules show distinct progressive changes with the increasing age of the placenta, which may be interpreted as being due to senility. The membranes of 50 labor cases were studied by Belosor[165] who found that hyalin change in the amnion is a physiologic process which makes it easy for the

amnion to tear during labor. In the cases where the amnion is born with the fetus, the hyalin change is only mild and accounts for the nonrupture of the membrane.

MISCELLANEOUS

The justification for the prenatal care of the pregnant woman is what it will do for both mother and child. Polak[166] studied 3000 cases of pregnancy and labor and found that the less prenatal care the mothers received, the higher was the infant mortality. He outlines the chief points in prenatal care. According to Eichel[167] the prevention of death in childbirth depends upon (1) education of the public to the necessity for competent prenatal care and to the grave dangers of criminal abortion; (2) suppression of the criminal abortionist; (3) adequate hospital facilities for the poor and those of moderate means; (4) measures to make available expert obstetric advice for physicians in rural districts; (5) elevation of the standards of obstetric training and practice; (6) extreme aseptic precautions in the care of the patient, and (7) clinical, pathologic and statistic research to discover facts at present unknown and to discover the routes of puerperal infection.

Mosher[168] takes up the question of reducing the maternal death rate in Missouri and proposes the following: (1) to begin a campaign of education of the profession, a postgraduate drill in the diagnosis and management of pregnancy and labor; (2) to have a new curriculum of obstetrics which shall be more or less standardized; (3) to reach the secretaries of the state medical societies and through them the secretaries of the county medical societies to urge their members to stress the subject of obstetrics at their meetings. Morris,[169] who writes about conditions in Australia, agrees essentially with the above authors. Flint[170] is of the opinion that the most important factor which will produce improvement in maternity statistics is the better education of the undergraduate student. If the practice of obstetrics were invested with greater dignity and were better paid, more able men would be attracted to this branch of medicine. Flint believes that infection occurs most frequently in private practice and in general hospitals and least frequently in a special maternity hospital. Less operating and more conservatism is the outstanding remedy for the present high mortality.

It is emphasized by Rowland[171] that obstetrics occupies at least 30 per cent of the time of the general practitioner and yet only 4 per cent of the total number of hours in the medical school curriculum are allotted to its teaching. To devote less than 15 per cent of the time of the last two years to obstetrics is a monumental mistake.

A number of reports have appeared in which the results of obstetric practice are analyzed. Stone and Sisson[172] review the work done at the Johns Hopkins Hospital and also outline a very useful schema for the ready indexing of obstetric records. Hibben[173] surveys the results of the city of Pasadena, California. Kennedy, Strean, and Harries[174] give the results at the Chicago Lying-In Hospital during the years 1918-1925, while Fitzgibbon, Corbet and Falkiner[175] analyze the results at the Rotunda Lying-In Hospital. Tottenham[176] in his report, reviews the maternal mortality in a number of American hospitals.

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Correspondence

To the Editor:

The following account of a visit to Prof. Stroganoff in Leningrad and to Moscow in September, 1925, may be of interest to the readers of the Journal. The purpose was twofold: to visit Prof. Stroganoff's clinic in Leningrad, and to learn something of the Soviet's program for maternal and infant care. To the clear statement of these purposes and to the efforts of Prof. Stroganoff we owed our visé, the procuring of which, however, was a most difficult task, for permission to enter Russia is granted only for very definite reasons. This letter is not a discussion of politics, nor of the so-called dangers of travel in the U. S. S. R. Everywhere we received most courteous treatment. We should like to go again.

We spent four days in Leningrad. Prof. Stroganoff gave us the greater part of two working days. He is in charge of the Obstetric Division of the State (formerly the Imperial) Institute for Obstetrics and Gynecology. It is situated across the Neva, in the Vasily Ostrov district of the city, opposite the University, and but a short distance from the former Winter Palace. It is in its own grounds with a high iron fence, and it seemed a haven of rest from the city outside. Everyone upon entering must lay aside wraps and coats, and put on a long clean white gown. It is an excellent building, erected ten years ago at a cost of $2,500,000, with wide corridors, tiled floors throughout, and an abundance of light and air. It is scrupulously clean and modern in every way. At the head of the wide marble stairway facing the entrance is the statute of Dr. Ott, who has been the moving spirit of the institution. The hospital has apparently suffered little deterioration (though some is evident), is well staffed and managed, and * * * * planned on a most elaborate scale. It is a postgraduate institution for doctors and has a school for midwives. Dr. Stroganoff has about 150 beds on his service. According to the rules, every doctor doing work in obstetrics here takes a bath before entering the department. There are two delivery units, used on alternate days. Delivery takes place on the beds in the labor-delivery rooms, and normal cases are cared for by the midwives. Private rooms are about $1.00 per day. Dr. Stroganoff lives in the hospital grounds; his wife, also a physician, works in the same institution. He invited us to his apartments and we were most interested to study the man himself. He is a gentleman of the old school, apparently between sixty and seventy years of age. It has been more difficult for him to adjust himself to changed conditions than for the younger men of his staff. All, without exception, expressed admiration for the Soviet program for maternal and infant care, and said that we could find out all about it in Leningrad, without going to Moscow.

He was proud that a doctor should come so far to see him and his world-famed work, for few indeed come these days, and (as a matter of fact) few Americans ever made the long journey in the old days. He was most happy and enthusiastic and keenly interested in America. * * * * Incidentally, he was much amused by the inquiry from this country as well as from England, whether he was still alive. He speaks a little German and English. * * * * One of his assistants stated that his salary from the State was about $100 a month, and that he received some extra from private work, though very little.

Naturally we were most interested in his treatment of eclampsia and his results. We had the rare opportunity of seeing him treat a case. He elaborated his treat-

ment in 1897, and published his method in a Russian journal in 1899. As far as I have searched in American literature, nowhere have I found his complete technic, note, I say *complete*. His fundamental idea is, *stop the fits*. The greater the number of fits, the higher the mortality. Formerly, he considered eclampsia a contagious disease; his present theory is that it is of placental origin, the syncytial cells producing antibodies or themselves breaking down into toxins. The sequence of events is: the toxins (whatever their origin) irritate the nervous system, particularly the vasomotor, which is especially susceptible during pregnancy; the result is blood vessel spasm with increased blood pressure, headache, eye symptoms, epigastric pain, convulsions, with loss of consciousness. The quality and quantity of the toxins and the degree of irritability of the nervous system determine the severity of the reaction. In the vast majority of cases eclampsia is a self-limited disease. His treatment tries to: (1) lessen the toxins in the blood by the administration of fluid, by the production of perspiration, and by venesection; (2) lessen the irritability of the nervous system by the prevention of irritation, and by the use of narcotics, morphine, chloral hydrate and chloroform (all used more or less haphazardly for fifty years). These reduce vessel spasm, convulsions and headache; lessen pain; dilate vessels; (3) maintain body functions.

He has treated 900 cases of eclampsia, the last 300 by his "improved method." In these last 300 cases he has had eight deaths, a maternal mortality of 2.6 per cent, and of these four were moribund on admission. Among these 300 cases his fetal mortality was 16 per cent. During the last year he has had 50 cases with two deaths, one moribund on admission and one dying of hemorrhage into the fourth ventricle. He has treated 25 cases by consultation over the telephone, and hopes to treat a case by radio! He expressed regret that his method (not some "modified Stroganoff," for, he asks, what valid reason has one to modify it?) had not been thoroughly and strictly carried out in this country, for he feels that our mortality could be lowered materially. He is very insistent that to get proper results with his treatment the technic must be adhered to very rigidly. Our visit with him and to his clinic was very well worth while.

Armed with a letter to the "Narkomsdraw" and a personal note to Mme. Kamanev we traveled to Moscow to learn something of the Soviet program for maternal and infant care. Soviet Russia proper, including most of Asiatic Russia, but not White Russia and the Ukraine, has a population of 96,500,000, nearly 90 per cent rural, with a density of 4.8 per square kilometer. There is an illiteracy of probably over 80 per cent, and a peasant class, poor, ignorant, superstitious, hostile and suspicious, serfs till sixty odd years ago. Among the mass of the people pregnancy, childbearing, and childrearing have little changed since Peter's time or before. The problems of maternal and infant care, under such conditions (particularly rural), are very great. The task is staggering. The department having it in charge realizes the situation very clearly and has apparently worked at the problem along three lines, the last two representing definite changes of policy. First was the establishment of dispensaries (consultations) and nurseries. The mothers must be instructed, the milk guarded, and an intensive propaganda for infant care started. From 1917 to 1924 nurseries increased from 14 to 510; children's dispensaries from 6 to 262; dispensaries for pregnant women from none to 159; village dispensaries from none to 117. In 1925, one hundred and twenty-five new dispensaries (consultations) were established in cities and towns, 120 in rural districts; 137 new nurseries were also established. Special emphasis is placed upon summer nurseries in the villages for the mothers working in the fields. Their number increased from 125 in 1922 to 524 in 1924. In the province of Samara during two months in the summer of 1925, two thousand children passed through such nurseries. The goal is to make the consulta-

tions the center of "healing, prevention and education"—by word of mouth, literature, leaflets, pamphlets, etc. In 1924, one million three hundred and fifty thousand propaganda cards for maternal and infant care and 80,000 colored posters were distributed. Nowhere in the world is there anything like them.

The second line of endeavor has been the shifting of the emphasis of service to the masses, from the city to the country. This began in 1922. Facilities for childbirth and childcare are very primitive in the rural districts. Instead of one obstetric bed for each 1,500 of population (which they figure is the proper ratio), there is only one for each 4,500. Village dispensaries are without physicians, scales or exhibits. There are not enough doctors and trained midwives. Funds have not been available, and penetration into the villages and the country has been extremely slow.

Thirdly and most recently the attempt has been made to enlist the help and interest of the local workers' organizations and the communities themselves, especially the cooperative societies and the mutual aid committees, asking for financial aid and for space in the cooperative stores for articles for mother and child. The large industrial companies have done some very good work for mothers and their babies, among their workers and in their communities.

It is frankly admitted that, strictly speaking, little has been accomplished. They say, "At least we are trying to do something. What can be accomplished at such a task in eight years (really about half that)? Give us time and a chance."

The Department of Maternal and Infant Welfare maintains the following types of institutions: maternity hospitals and wards, homes for mother and child, homes for children under one year, homes for children one to three years, consultations for pregnant women, consultations for babies, day nurseries (including summer nurseries) and legal consultations.

Our contact with this phase of public health work (maternal and infant welfare) was made through a Dr. Mark Scheftel, graduate of the University of Karkov, student of law three years at the Sorbonne in Paris, student of medicine five years in Rome, speaking Russian, German, French, and Italian. He had spent some time in prison before the Revolution because of his political views, is an ardent communist and is happy to work and receive $96 a month. We met the People's Commissar of Health, Dr. N. A. Semashko, and his assistant, Dr. Solovief. This Commissariat of Health (known as the "Narkomsdraw") has at least seventeen departments. The Dr. Scheftel mentitoned is chief of the department dealing with public health relations with other countries. There is a Russian Public Health Service and representatives in France, England, Germany, Italy, Switzerland, Austria, and the United States. The Department of Maternal and Infant Welfare is in charge of Dr. Lebedeva, a woman physician. She was not in Moscow when we were there. We visited a home for mothers and babies, a communistic idea, free for two months before and two months after birth with one week in a maternity hospital or ward for delivery. Many cases of illegitimacy are in such homes. Two months postpartum the mother may go out and work and thus contribute to the support of herself and child; the care is otherwise, of course, free. In the dispensaries for consultations for pregnant women effort is made to register the mothers in the fifth month, and they are given a course of six lectures.

The most interesting institution that we visited in Moscow was the Central Institute for Mother and Infant Welfare. This was formerly the Foundling Hospital, founded by Empress Catherine in 1763 and maintained through the succeeding monarchies by the sale of playing cards, which was made a government monoply. It is an enormous place, formerly accommodating 2,500 infants. Its gardens and grounds appear rather shabby. It has been made into an institution for the graduate instruction of physicians in obstetrics and pediatrics, and a school for midwives and for

nurses, each of these two latter courses lasting two and a half years. The attendance when we were there was about 150 doctors, and about 250 midwives and nurses each. There are 100 obstetric beds, 50 cribs in the day nursery, and places for 450 well and sick (no infections) babies which are admitted only if suitable for scientific or teaching purposes. We were conducted about by the assistant director, a Dr. Baron, graduate of the famous university at Dorpat in Esthonia (at that time a part of Russia). The buildings are mostly old (we saw very little new building in Russia), but spotlessly clean, in perfect order and well managed. There is a scientifically organized milk kitchen, a rather small laboratory, and a moderate sized library (rather in confusion) with many foreign journals. They have their own journal, *Zur Erlehrung der Psychologie, Pathologie und Physiologie des Kindes.* Here also was a most complete exhibit of the history of breast feeding, beginning with Romulus and Remus; also a large display of posters and a number of life-sized wax figures. Here doctors, nurses and midwives are trained in maternal and infant welfare for Soviet Russia. But they are trained in other things than science. Let me quote from a report of the department: "Welfare courses for physicians, midwives and nurses in general social practice, for political education of backward women, explaining how the Soviet regime improves the status of the working woman, so that they become accustomed to giving talks, addressing meetings, managing excursions, working with delegates." Here in 1924 were thus trained 97 physicians, 67 midwives and 45 social workers.

In closing I want to make one thing very clear. Whatever I have said about this work of Soviet Russia, do not for a single moment conclude that I harbor any delusions about the Bolshevik government and its rather wearisome political propaganda. It is a most powerful political machine, that now exercises a despotism as relentless and widespread as ever existed under the czars. But, whatever may be the methods of the Soviets, however much we may imagine that they menace the peace, order and safety of the civilized world, and however great may be the mockery of their communistic freedom, nevertheless they are trying to do something for the common woman of Russia and her child, for whom little enough has been done for two hundred years. Doubtless much is on paper only; much is just hope and dream. Possibly they showed us only what they wanted us to see, but that of its kind was good and clean and directed by educated and interested men whom I deem it a privilege to have met. They are deadly in earnest about it all. Some day, I believe, great things are going to come out of Russia.

S. B. Blakely, M.D.

Binghamton, N. Y.

February 25, 1926.

Erratum

Issue of March, 1926, p. 420. In the discussion by Dr. P. B. Salatich, at a meeting of the New Orleans Obstetrical and Gynecological Society, on the delivery of the fetus in an abdominal pregnancy by colpotomy, the following sentence was inadvertently omitted:—"I need not remind you that this was many years ago." Correction of the error is herewith made, as Dr. Salatich is naturally averse to appearing as an advocate of such procedure.

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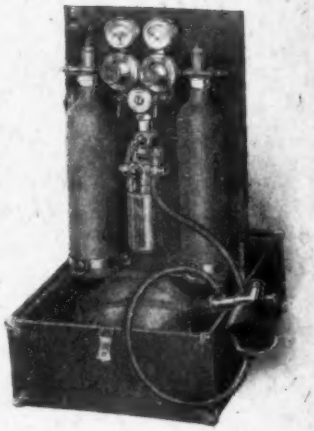

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